THE VETERINARY RECORD

FOUNDED BY WILLIAM HUNTING, F.R.C.V.S., 1888.

No. 24. JUNE 16, 1945 VOL. 57.

Bovine Mastitis*

G. N. GOULD, M.R.C.V.S.,

SOUTHAMPTON

The object of my paper is to set before you a suggested classification of the common types of bovine mastitis, based on clinical observation, with confirmation of diagnosis by microscopic or cultural examination in the laboratory, and to discuss treatment and prophylaxis. The most recent and comprehensive classification is probably that made by Stableforth. It is as follows :—

The Kinds of Mastitis	*The Bacteria Concerned*	*Outstanding Features*
1. Common chronic streptococcus mastitis	*Str. agalactiae* (Group B (Lancefield) Mastitis Group I)	Widespread, incidence 35 per cent. of milking cows ; many carriers or milk cases, but causes more clinical mastitis and loss of milk than any other
2. More acute streptococcus mastitis	*Str. dysgalactiae* (Mastitis Group II)	Sporadic, acute or subacute, few carriers, serious in some herds
	Str. uberis (Mastitis Group III)	Sporadic, usually subacute, some carriers
	Str. pyogenes equi (" Animal pyogenes " Group C (Lancefield))	Uncommon, acute, carriers rare
	Str. pyogenes (Group A (Lancefield))	Rare, acute, carriers rare
3. " Summer Mastitis "	*C. pyogenes*	Heifers and dry cows, acute, purulent, toxic, very serious in some herds and years
4. Staphylococcus mastitis	*Staph. aureus*	Usually milk, chronic, fairly widespread ; but may be acute, toxic and gangrenous
5. Coliform mastitis	Various coliforms	Rare, acute, toxic
6. Tuberculous mastitis	*M. tuberculosis*	Nearly always " cold," chronic and focal
7. Other forms	*F. necrophorus*, pasteurella, etc.	Rare

In this paper I shall limit my observations to mastitis due to streptococci, staphylococci and *C. pyogenes*.

Suggested Classification

1. MASTITIS DUE TO STREPTOCOCCI

Organism	*Type*
A. *Str. agalactiae*	(i) Acute of the lactating cow
	(ii) Sub-acute of the lactating cow
	(iii) Chronic of the lactating cow
	(iv) Sub-acute of the dry cow
B. *Str. dysgalactiae*	(i) Acute of the lactating cow
	(ii) Sub-acute of the lactating cow
	(iii) Sub-acute of the dry cow
C. *Str. uberis*	(i) Sub-acute of the lactating cow

2. MASTITIS DUE TO STAPHYLOCOCCI

Organism	*Type*
A. *Staph. aureus*	(i) Hyper-acute of freshly calved cow
	(ii) Acute of lactating cow
	(iii) Sub-acute of lactating cow
	(iv) Chronic of lactating cow
	(v) Acute and sub-acute of dry cow

3. MIXED INFECTIONS

Organisms	*Type*
A. *Str. agalactiae* and *Staph. aureus*	(i) Acute and sub-acute of the lactating cow

4. MASTITIS DUE TO *C. pyogenes* (SUMMER MASTITIS)

Organism	*Type*
A. *Corynebact. pyogenes*	(i) Acute of the dry cow and heifer

* Presented to the Sussex Division, N.V.M.A., at Brighton, November 3rd, 1944.

1. A. (i) ACUTE *Str. agalactiae* MASTITIS

As met with in the freshly calved cow or in the early stages of lactation. The quarter swells diffusely, is painful, hot to the touch, the milk becomes clotty, the flakes usually being of yellow colouration. Constitutional symptoms are present and temperature is usually 105° to 107°.

1. A. (ii) SUB-ACUTE *Str. agalactiae* MASTITIS

The symptoms are similar but less marked. The condition is often a flare-up of a clinically recovered quarter.

1. A. (iii) CHRONIC *Str. agalactiae* MASTITIS

Is better described as sub-clinical where occasional flakes are seen in the milk, particularly in the fore milk and then only after careful and repeated daily examination with a strip cup. True chronic cases occur as a sequel of a previous acute attack and may be associated with some localised induration of the quarter and occasional or persistent clots in the milk. The secretion is usually poor in quality with a blue or watery tinge compared with milk from the normal quarters. In such cases a flare-up during the dry period or at parturition is very common.

" *Cording* " *of the Teats* is commonly met with in *Strep. mastitis*. It is best detected by rolling the teat between the finger and thumb, comparing the suspected teat with the others. The lining of the teat duct becomes thickened and the act of milking is interfered with. It may and does occur as the initial condition and is frequently followed by clinical mastitis.

" Blackspot " is stated by Hignett to be due to *Fusiformis necrophorus* infection of the sphincter of the teat duct. The condition causes difficulty in milking and sometimes complete obstruction. The resulting inefficiency and injury induced in attempts to milk are without doubt contributory factors of the onset of sub-acute or acute *Str. agalactiae* mastitis which is a common sequel in the absence of treatment.

1. A. (iv) SUB-ACUTE *Str. agalactiae* MASTITIS OF THE DRY COW

Is marked by *diffuse* swelling of the quarter, usually with no marked constitutional symptoms. The secretion is clotty and thus differs from the usual colostrum. It is the forerunner of some of the acute cases of *Str. agalactiae* mastitis seen at parturition. It is often a sequel of faulty drying off or of previous infection in the same quarter.

1. B. (i) ACUTE AND SUB-ACUTE *Str. dysgalactiae* MASTITIS

There is usually a herd history of this infection which appears sporadically and which is difficult to eradicate. The symptoms resemble those of acute agalactiae mastitis, but in my experience sub-acute cases predominate. The swelling is not usually diffuse and induration, particularly at the base of the teat, is more marked. The secretion usually contains soft slimy clots of whitish colour.

1. C. (i) SUB-ACUTE *Str. uberis* INFECTION

The condition is usually sub-acute and the clinical symptoms resemble those of sub-acute agalactiae mastitis. It occurs sporadically at any time in lactation.

2. A. MASTITIS DUE TO *Staph. aureus*

In my area more than 20 per cent. of cases of mastitis met with are due to this infection. This percentage differs in various parts of the country and in some areas is much higher. This probably accounts for a proportion of the bad reports of sulphonamide and infusion therapy received from time to time.

(i) HYPER-ACUTE STAPH. MASTITIS OF FRESHLY CALVED COW

This is the acute gangrenous mastitis known to all and needs no description. The secretion is usually haemorrhagic and has a marked odour of freshly killed meat.

(ii) ACUTE STAPH. MASTITIS OF THE LACTATING COW

Shows characteristic diffuse enlargement and induration of the whole of the infected quarter which becomes board-like in consistence. The udder appears lop-sided and the infected quarter is cold to the touch. A comparatively small amount of secretion is obtained which is thin and whey-like and on standing often shows a pinkish tinge. A yellowish mass of clot rapidly forms on standing. The secretion has an odour of freshly killed meat. Constitutional symptoms are present, temperature up to 106°, inappetence, dullness

and dejection marked. Milk secretion in the non-infected quarters is greatly suppressed.

(iii) Sub-acute Staph. Mastitis

Constitutional symptoms are present but are less severe. Dullness and dejection are again marked. Induration is often localised to the udder around the base of the teat and frequently consists of "cording." A subcutaneous wheal is characteristic of this condition, running from the base of the teat of the affected quarter backwards or forwards. The secretion varies but is often greyish in colour with very small flakes. The quarter appears weighted and lop-sided and as in the acute type, milk secretion in the non-infected quarters is greatly suppressed.

(iv) Chronic Staph. Mastitis

May be associated with local induration or "cording" as a sequel of previous acute or sub-acute attack. Many of the pinkish milks met with in the *later stages* of lactation are associated with staphylococcal infection.

(v) Acute and Sub-acute Staph. mastitis of the Dry Cow

Are frequently met with in the later stages of gestation and are precursors of the acute type of the lactating cow previously described. Symptoms are similar to those in the lactating cow. The secretion is sparse.

3. Mixed Infections

Symptoms resemble those of the predominating type of infection. Mixed infections are comparatively common and their occurrence demonstrates the value of bacteriological diagnosis as a routine to check clinical diagnosis.

4. *Corynebact. pyogenes* Mastitis

The history, induration, constitutional symptoms and smell of the secretion are typical and well known. I have a certain amount of evidence from careful supervision of dry cows that this infection is often superimposed on previous infection of the dry cow with streptococci or staphylococci. It is possible that this may also be true in heifers. This theory is not new and has been previously reported from time to time by other observers.

Treatment

Str. agalactiae Mastitis Acute and Sub-acute respond satisfactorily to sulphanilamide or to a combination of sulphanilamide and udder infusion. Early application of treatment with adequate dosage and dosage at correct intervals to maintain the concentration in the blood stream is of great importance. I give an initial dose of 3 oz. and then 1 oz. every eight hours. For convenience I fix these times at 6 a.m., 2 p.m. and 10 p.m., the first 1 oz. dose being given at the nearest of these times to the initial dose of 3 oz. The course is persisted with for a minimum of four days.

Once the acute phase is over, whether the milk has returned to normal or not, the quarter is infused. This is usually on the second or third day. I find by doing this recovery is expedited and there is less risk of recurrence at short interval. For infusion acriflavine 1 to 10,000 is most frequently used, the maximum quantity injected into a quarter being ¾ pint. The quarter is milked out, the teats cleansed with a hypochlorite or spirit and the infusion made. The solution is left in the quarter for 15 to 20 minutes. Where induration exists and particularly in cases associated with "cording of the teat," I prefer to use a soluble sulphonamide such as E.O.S.—2 to 4 oz. in 1 pint, soluseptisine 8 per cent. solution or L.S.F. made up to give a concentration of 2½ per cent. sulphanilamide. Where soluble sulphanilamide is used it is left in the quarter eight to twelve hours.

If the milk has not returned to normal in three days the infusion is repeated.

In chronic or sub-clinical cases I rely on infusion with acriflavine and following the recommendation of Golledge of Trowbridge, I find I get the most rapid and satisfactory results by infusing on two successive days using the same limited amount of solution.

I have used tyrothricin in chronic streptococcic mastitis. I am not at all convinced that the results are any better than those obtained with acriflavine. A pronounced and often alarming reaction in the injected quarter is not infrequent.

In "blackspot" I make a practice of performing a crucial incision to render milking easy as soon as the trouble is reported and give a precautionary course of sulphanilamide to last four days. The restraint for the operation consists of nosing and elevating the tail, putting pressure on it in the forward direction about 6 inches from the base and then by use of a dental syringe with fine guarded needle and multiple puncture making a series of injections around the base of the teat to desensitise below it. I find that a miniature type of Hudson's special instrument inserted into the teat, after the crucial incision has been made, and pulled through the sphincter gives a more satisfactory result where the secretion cannot be milked out satisfactorily after the crucial incision operation. If mastitis symptoms are present when the case is reported, similar treatment is adopted and sulphanilamide followed by infusion gives highly satisfactory results. After the crucial incision operation the teat is cleansed before and after milking, and the teat protected with sulphanilamide in liquid paraffin or acriflavine ointment and bandaged between milkings for four days. For infusion a Higginson's syringe is used with teat needle attached. The syringe and needle are sterilised by boiling, wrapped up in a sterilised cloth and paper and sealed, and once used on a cow are not used on another until they have again been sterilised by boiling. Care is taken to fill the syringe before infusion is commenced to avoid pumping in air, and after use to pump the needle clear of the solution.

Str. dysgalactiae Mastitis

Treatment is on the same lines but response to sulphanilamide is less satisfactory, although there is usually some tendency to recovery. Infusion treatment follows but not infrequently has to be repeated two or three times and sometimes more. In this infection I find that I get a large percentage of cases in which there is partial loss of the quarter and in some cases complete loss.

Str. uberis Infection is less responsive to treatment, which is on the same lines. In my practice this infection is not common.

Staph. Mastitis. Treatment requires patience both on the part of the veterinary surgeon and the farmer. Sulphanilamide appears to be of little or no value. Staphylococcus toxoid, in doses of 10, 20, 30, 40 and 50 c.c. at two-day intervals, gives reasonably satisfactory results and is well worth while. It is not unusual to have the secretion back to milk with marked induration still persisting. Microscopic examination to differentiate from tuberculous mastitis is important and must not be neglected. *Infusion is contra-indicated, the results usually being disastrous.*

Golledge recommends toxoid given on three successive days in 10 c.c. doses and after a further interval of 24 hours a large dose of 30 to 40 c.c., repeating if necessary. The cow quite often shows some reaction after the larger dose, but the results claimed are good. Recently I have combined an intramuscular injection of 10 c.c. colloidal manganese with each toxoid injection, giving it on the opposite side of the neck. Recovery appears to be expedited and recent results justify a further trial of the treatment. In acute cases aspirin in ½ oz. doses twice daily appears to exert a beneficial effect. Toxoid treatment is also given in sub-acute cases and in acute staphylococcus mastitis of the dry cow. If the latter occur a week or two before parturition, it is more difficult to get satisfactory results, improvement being much quicker once parturition has occurred.

Mixed Infection

In mixed staphylococcus and streptococcus infection a combination of the two treatments is given, the decision whether or not to infuse depending upon the predominating infection, the absence of induration, and the disappearance of the staphylococcal organisms in samples examined at intervals. Recently I have had an opportunity of using a standardised preparation of antibiotic metabolites containing living Penicillium Notatum Hyphae on a limited number of *Str. agalactiae* and mixed infections. Results have been promising in some cases.

C. pyogenes Infection

The specific toxoid is a definite advance in treatment, appearing to shorten the period of illness. Aspirin to relieve the pain is also beneficial. Where it is difficult or impossible to milk the affected quarter, removal or crucial incision of the teat, followed by frequent cleansing with a hypochlorite is indicated. I have never saved a clinically affected quarter.

Prophylaxis

Control of mastitis is dependent upon efficient supervision and management of the herd, particular attention being paid to the early detection of sub-clinical and clinical cases and to the supervision of the dry cows.

Prompt diagnosis and treatment of clinical cases is important.

I recommend the infusion of quarters known to have been infected during lactation with acriflavine 1 in 10,000 when the cow *is reaching* the drying off stage, and prefer to leave the infusion for one hour and repeat the following day. Subsequently the cow is dried off slowly and efficiently after the secretion has returned to normal.

The usual methods of dairy hygiene recommended are adjuncts to control but appear to have been mainly devised with a view to the production of clean milk. I recommend the cleansing and drying of teats with a hypochlorite solution *after milking as a logical measure for control.*

Udder cloths must be sterilised daily and in no case should one udder cloth be used for more than ten cows. Udders are better

clipped and gross contamination removed prior to the normal cleansing of the udder with a hypochlorite solution. Prompt treatment of "chapped teats" and surgical attention to hard and difficult milkers is insisted upon.

Where milking machines are used, the dipping of teat cups in between cows in clean water first and then into hypochlorite appears to be of definite value. The water and solution should be renewed for every ten cows. The pressure of the machine should be as low as possible consistent with efficient milking and should not exceed 14 lb. The pulsation should be between 35 and 40 and should never exceed that recommended by the makers. Regular cleansing and sterilising of the machine, particularly of the teat cups, is essential.

Stripping of cows after machine milking is, in my experience, necessary to the maintenance of mastitis control. I have seen disastrous results where attempts have been made to dispense with stripping. This appears to be possible in heifer herds, provided care and patience is practised at the commencement of the system, but even under such conditions some heifers will not let down their milk to the machine and have to be culled on that account. In my experience the adoption of such a system in herds which have been previously stripped has always been associated with subsequent outbreaks of mastitis. It would appear that the present-day milking machine is capable of considerable improvement, which will doubtless come in the future, but the efficiency of the machine is absolutely dependent upon the efficiency of the user.

When fresh calved cows or heifers come into the herd, I recommend a thorough washing of the udder and teats with a detergent such as Cetavlon or non-irritant soap and water, and also recommend this in clinical cases as a daily procedure during treatment.

Drying off of dairy cows should usually be a gradual procedure, but must of necessity vary in individual cows. Difficulty is often experienced in cows giving a comparatively high yield as they approach the period at which it is intended to dry off. Rapid drying off by sudden cessation of milking of cows known to have been infected during lactation is often disastrous. Where the udder is known to be healthy, sealing is a satisfactory and rapid means of achieving the desired results. For this purpose the udder is milked out, the teats cleansed with spirit and a small seal of collodion placed on the end of the teat. I find that by placing the collodion in a watch glass so that a comparatively shallow seal is formed over the orifice of the teat, it remains in position far better than a large seal which frequently peels off.

Where widespread infection has existed in the herd, I find milking through the dry period to be of great value in infected cows, and have no hesitation in recommending it. One finds that in a large percentage of cases the subsequent lactation does not come up to the expected level and the risk of milk fever is enhanced where the cow has continued to give milk right the way through, and particularly where a considerable amount of milk is being secreted before calving, but as a measure of mastitis control I have found it valuable.

The sealing of teats at the time of routine inspection of the udder of dry cows at the susceptible time of the year appears to be of value in the control of *C. pyogenes* infection.

Chemotherapy appears to hold out great hopes for the control as well as the treatment of mastitis. I understand that trials have already been made with penicillin and good results obtained.

Management plays a very great part in this disease. I have experienced persistent outbreaks in herds where the buildings and hygienic conditions appear to be of the best, but on the other hand have herds kept under what might be considered poor and unhygienic conditions where mastitis rarely occurs.

Quiet handling of the cows, milking at regular times each day and not permitting the interval between milkings to be too short, efficient milking, and the avoidance of injury are important. Where possible, use the same milker for the individual cows.

In the winter time when the cows are lying in, use clean dry straw for bedding.

Where udder or teat injury or soreness has occurred, treat it as of major importance and give a precautionary course of sulphanilamide.

Keep careful records of mastitis cases. Treat infected quarters as the cow is drying off. Supervise the cow during the dry period, and if any abnormality is detected, give it the requisite treatment, including milking out immediately and continue milking until recovery or parturition if parturition is approaching.

I have advised giving cows which are recorded as having had streptococcic mastitis in the previous lactation a four-day course of sulphanilamide commencing at parturition. This precaution appears to have been of very great benefit in some herds which had been heavily infected.

The culling of the old chronic cases which continue to have recurrence in spite of treatment is to be recommended.

Careful attention to any obstruction of outflow from the teat, with early surgical interference where necessary, is to be recommended, followed by a prophylactic course of sulphanilamide. Careful after treatment of all teat cases is most important if success is to be achieved.

The routine examination of udders of dairy stock is valuable, not only from the public health aspect, but also because it enables the veterinary surgeon by repeated practice to appreciate fully differences in consistence and conformation of both the udder and the teats that constitute normality, and to assess the relationship of these differences to the incidence of mastitis or teat abnormalities which may arise later. The examination also gives the opportunity of detecting departures from the normal so often overlooked by the milkers until they become gross. The correlation of laboratory findings of the examination of milk samples where abnormality is detected or suspected is of great potential value in clinical investigation into mastitis and in rational control in the herd.

Palpation should be followed by the examination of the fore milk by the use of the strip cup, and where abnormalities are detected, by microscopic examination. Microscopic examinations take up considerable time in busy agricultural practice, usually at the end of a long day. I feel convinced that an essential preliminary to more efficient control of mastitis is the rapid provision of an adequate number of laboratories through the country to which milks, particularly from clinically affected quarters can be sent, and reports provided with the minimum of delay.

REFERENCE

STABLEFORTH, A. W. (1942.) Royal Society of Medicine. Feb. 18th.

CLINICAL COMMUNICATION

Bovine Pasteurellosis

The Occurrence of Haemorrhagic Septicaemia and Broncho-pneumonia Simultaneously in One Outbreak Among Young Calves

D. W. P. BYTHELL

HARPER ADAMS AGRICULTURAL COLLEGE

Under this heading, Mullaney[1] reports an outbreak among Jersey calves in which pathological changes were encountered in the lungs and alimentary tract, and where a Gram negative bipolar organism was isolated from the lungs and mesenteric lymph glands.

During 1944 one suspected and three bacteriologically confirmed outbreaks were encountered in widely separated districts in Shropshire among young calves, characterised by sudden death at an early age, or by pneumonia in the survivors.

HISTORY

One of these outbreaks, in an Attested Ayrshire herd, was the subject of detailed observation and experimental treatment. The calves on this farm are housed in old-fashioned loose boxes of brick and timber with concrete floors, and as the bedding becomes soiled more straw is added to produce manure. Each box holds five to ten calves, there being no individual calf pens on the premises, while feeding is from buckets which are infrequently sterilised and these are shared among the different pens. Between 13.10.44 and 27.10.44 five calves died suddenly but no steps were taken to obtain a diagnosis. On 28.10.44 two further deaths occurred within two hours of the morning feed and these were submitted to a *post-mortem* examination. There had been no illness in any calves prior to these deaths, but there was a history of an outbreak of calf pneumonia five years previously which was said to have responded to M. & B. 693 therapy.

EXAMINATION OF ORIGINAL MATERIAL

The two calves were each three days old at the time of death. Examination showed petechial haemorrhages on the epicardium, liver and kidneys and the lungs showed slight congestion, but there were no gross pathological changes in any organ. Cultural examination of the heart blood, liver, spleen and lungs revealed small dewdrop colonies on Lemco-peptone-agar slopes in 20 hours at 37° C., and smears from these showed Gram negative cocco-bacilli microscopically. Stained for five minutes by Leishmann's method, the organism was seen to be bipolar and biological examination showed it to be lethal for mice in seven to 12 hours, following intraperitoneal injection of 0·1 c.c. of a 24-hour broth culture.

A diagnosis of Pasteurellosis was made, the disease having all the characteristics of haemorrhagic septicaemia.

GENERAL DESCRIPTION OF DISEASE

Post-mortem examination of 14 further cases which died on this farm up to 21.1.45 showed two types of the disease:—

(*a*) *Peracute form.*—Death usually occurred within three days of birth and the findings were confined to small haemorrhages under the serous membrane of the soft organs, and sometimes throughout the lungs. The organism was isolated in six out of seven calves

which died of this early form of the disease, from the blood stream and parenchymatous organs.

(*b*) *Chronic form.*—In calves which survived the septicaemic form, but which died following several days' illness, marked changes were observed in the lungs. Typical areas of hepatisation with markedly thickened interlobular septa were constantly observed, giving a "marbled" appearance. The bronchi and trachea were often filled with a bloodstained froth, but the nasal discharge was not discoloured, being watery or mucoid in appearance. In a few cases the mucous membrane of the small intestine showed a varying intensity of hyperaemia over a length of several feet.

Symptoms

In the peracute form, death was so rapid that prostration was the only symptom noticed by the owner, the calves apparently dying in a coma. In the chronic form, from the age of three to four days up to 12 to 14 weeks, the condition was manifested as a broncho-pneumonia, characterised by slight respiratory distress after forced exercise, an intermittent soft cough and chronic watery or mucoid nasal discharge. Swabs from this last revealed Pasteurella on culturing which was still highly virulent for mice up to 9.1.45. Auscultation of the chest revealed patchy consolidation of both lungs and moist râles were audible to a varying degree often for four to ten weeks after the onset of symptoms, but the calves continued to thrive fairly well and to increase in weight. The severity of the symptoms gradually subsided after some three months' duration.

Pathogenicity Tests

A primary culture was sent to Weybridge and was found to be highly pathogenic for calves. Their report was as follows:—

Two calves were injected with the culture, one intravenously and one subcutaneously, both with 1 c.c. of overnight culture.

The animal inoculated subcutaneously ran a high temperature for three or four days and showed pronounced diarrhoea and nasal discharge as well as a local lesion. All acute symptoms had, however, passed by seven days, when it was killed. An extensive local haemorrhagic lesion was found together with some pneumonia and pleurisy, Pasteurella being isolated in large numbers from the local lesion.

The animal which was inoculated intravenously was found dead within 60 hours with a haemorrhagic septicaemia. Passage of the first generation from this animal killed another calf in a similar manner and a dried culture from this killed another calf at a similar dosage.

Two calves which received 1/10th c.c. after the first and third passages both showed no effects.

Attempts to Prevent (or Control) the Disease

The owner, in spite of the high potential value of these calves, could not be persuaded to isolate new-born calves and it was decided to try serum therapy at birth. From 13.11.44 each calf was given 15 c.c. of *P. boviseptica* antiserum subcutaneously as soon as possible after birth, usually within two hours. This quantity was later increased to 20 c.c., but no other hygienic measures were taken and each calf was put with the affected animals immediately after inoculation.

From the day when the serum was first used up to 22.3.45, 30 calves were born, ten of which died. Cultural examination revealed the presence of Pasteurella in one case showing early lobular pneumonia and in two cases of the septicaemic form. One case showed petechial haemorrhages in several organs, and four cases exhibited lobular pneumonia and "marbling" of the lungs, but cultural examination was negative in all five animals. Of the other two deaths one was a case of congenital torticollis while the other died following a fit; the organism could not be recovered culturally from either of these.

Nine of the surviving calves during this period all contracted pneumonia and clinically could not be differentiated from earlier cases which had not received serum.

The owner was then persuaded to put in some new-born non-pedigree bull calves which were not inoculated at birth. Seven calves were introduced as they were, born between 5.12.44 and 20.12.44 and three of these died within a week. All three showed the septicaemic form, one living in a state of coma for four days before death. The four survivors were slaughtered when two weeks old, but there was no evidence of infection macroscopically and cultures from the lungs were negative.

The results of serum inoculation are tabulated at the top of next column.

Treatment

By the beginning of December there were 33 calves, all of which were affected to some extent with the respiratory form. An attempt was made to influence the course of the disease by biological therapy, as the cases were considered to be too chronic to respond to sulphapyridine.

Table

	Calves not inoculated with serum at birth			Calves inoculated with serum at birth		
	No. at risk	Died	Became chronic	No. at risk	Died	Became chronic
Before 13.11.44 ..	35–40	11	*c.* 90%	—	—	—
5.12.44 to 20.12.44	7	3	0 (4 slaughtered)	—	—	—
13.11.44 to 22.3.45	—	—	—	30	10*	9
Totals ..	42–47	14	*c.* 90%	30	10	9

* Pasteurella recovered culturally from three cases only, but *post-mortem* findings suggestive of the disease found in five other calves. Two calves, which probably died from other causes, were negative on cultural examination.

The calves were divided into three groups, distributed as evenly as possible throughout the five pens, in all of which deaths had recently occurred.

Group A.—Six calves, were inoculated subcutaneously with 100 c.c. of *P. boviseptica* antiserum.

Group B.—Fifteen calves, were given doses of 2 c.c., 5 c.c. and 10 c.c. of haemorrhagic septicaemia vaccine at five day intervals.

Group C.—Twelve calves, were left as controls.

The serum and the first dose of vaccine were given on 11.12.44 and a clinical examination of all calves was made on that date and on 15.12.44, 21.12.44, 2.1.45 and 9.1.45. Records were made under the following headings: (*a*) temperature, (*b*) cough, (*c*) nasal discharge and (*d*) auscultation of the chest. The extent of the symptoms under the last three headings was recorded under a system of + or −, up to a maximum of ++++.

Statistical analysis of the results under these headings failed to find any significant difference between the three groups. It is, however, regarded as statistically significant that out of the 15 vaccinated calves, eight developed diarrhoea persisting for a week or more, and two of these died, while one other calf developed an acute generalised arthritis. None of these symptoms occurred among the calves in either the serum or control groups.

By 21.1.45 the symptoms of pneumonia and enteritis had almost entirely disappeared and the investigation was terminated.

Discussion

While the results of immediate post-natal inoculation with antiserum as a prophylactic were disappointing, the standard of hygiene was such that the calves were exposed to infection immediately after birth. Had the calves been housed under better conditions, including isolation in single pens, it is felt that a number of the subsequent pneumonia cases might have been avoided.

After the introduction of the prophylactic inoculation, nine calves out of 20 survivors (45 per cent.) contracted the chronic form, whereas before serum was used about 90 per cent. were affected. It is possible that this lower incidence may have been influenced by serum therapy although it may have been due to the natural regressive character of the disease.

There was statistical evidence that vaccination under the conditions described gave rise to enteritis, which is recognised as a separate syndrome of haemorrhagic septicaemia, while from the results of clinical observation neither 100 c.c. of antiserum nor vaccination appear to effect a favourable response once the disease has assumed a chronic form. The effect of larger amounts under better hygienic conditions might be worth investigating.

Summary

1. An outbreak of Pasteurellosis in young calves in an Attested Ayrshire herd is described.

2. Two types of the disease occurred simultaneously. Calves dying within three days of birth revealed *post-mortem* findings characteristic of haemorrhagic septicaemia, while the survivors were affected with broncho-pneumonia lasting for two months or more.

3. It appears that *P. boviseptica* antiserum as a prophylactic (20 c.c.) or as a curative (100 c.c.) is ineffective in these doses in controlling the disease under bad hygienic conditions, and that haemorrhagic septicaemia vaccine is probably contra-indicated in the treatment of the chronic form of the disease.

Acknowledgments.—Acknowledgment is due to Mr. T. F. Williamson, Hinstock, for his willing co-operation and to Dr. R. F. Montgomerie for his very helpful suggestions and also for supplying the serum and vaccine. Thanks are also due to Dr. A. W. Stableforth for his interest in the outbreak and for providing the results of the pathogenicity tests made at Weybridge, and to Mr. F. J. Dudley for the statistical analysis.

References

(1) Mullaney, P. E. (1945.) *Vet. Rec.* **57**, 79.
(2) Wooldridge, G. H. Encyclopaedia of Veterinary Medicine, Surgery and Obstetrics, Vol. 1, 106.

THE VETERINARY RECORD

June 16th, 1945

NUTRITIONAL ROLE OF THE MICROFLORA

SINCE the day of Pasteur the public imagination has been caught by the conception of " germs " as the cause of infectious disease and this has led to the belief that all " germs " are the ubiquitous enemies of mankind which must be destroyed at all costs by heat or by antiseptics. It would be impudent to suggest that an outlook as crude as this was generally held by members of the veterinary and medical professions, but it was inevitable that pathogenic bacteria, fungi and protozoa should become the centre of interest in both professions to the practical exclusion of the innumerable species of these organisms which had apparently little or nothing to do with health or disease.

The results of the invasion of animal tissues by pathogenic bacteria multiplying under favourable conditions are obvious and distressing, but the results of the activity of the multitude of non-pathogenic micro-organisms are largely taken for granted, if they are known at all, for they are part of what can be regarded as the normal processes of life. Perhaps the best example of such processes is the role of the micro-organisms of the soil, using the term in its broadest sense, for without the activity of soil bacteria and fungi vegetation would soon cease to exist and in consequence so would practically all forms of life on earth. A similar example is to be found in the alimentary tract of animals where the microflora play an important and in some cases an essential part in digestion. This subject was discussed at a recent conference of the Nutritional Society and a report of the proceedings of this meeting is published in this issue. The matter is of particular importance to the veterinarian for it is in the farm animals and in particular in ruminants, that the role of the microflora is most obvious. It is no exaggeration to say that a cow grazing the richest pasture would starve were it not for the bacteria of the paunch. Indeed, in contrast to pathogenic bacteria it can be said of the bacteria of the stomach of ruminants and of the large intestine of non-ruminants that their presence in mass means good nutrition, an essential for health, while their partial or complete absence would lead to malnutrition with the attendant susceptibility to disease.

Fortunately there is no likelihood of the rumen of the cow becoming sterile under any circumstances, for while the animal eats there will be bacteria in the rumen. The important thing to know, however, is to what extent the food determines the types of organism present and consequently the types of digestion that occur. There is evidence to show that the relative balance of various species forming the microflora of the rumen varies considerably with the diet, and until these variations and the influence that such variations have upon the type of digestion that occurs in the rumen are fully understood, the feeding of sheep and cattle will continue to be based upon empirical rather than upon scientifically accurate conceptions as to why different rations produce different results.

Weekly Wisdom

A child should be guaranteed a bottle of milk before it is guaranteed a bottle of medicine.—Dr. Edith Summerskill, M.P.

MEETING REPORT

Nutrition Society

THE NUTRITIONAL ROLE OF THE MICROFLORA IN THE ALIMENTARY TRACT

The 22nd scientific meeting (12th of the English Group) of the Nutrition Society took the form of a whole-day conference on the above subject, and was held at the London School of Hygiene and Tropical Medicine, on December 30th, 1944. The meeting was of especial interest to veterinarians and others interested in the nutritional physiology of ruminants, for the greater part of the proceedings related to cattle and sheep. Dr. W. R. Wooldridge, M.R.C.V.S., took the chair.

(1) **Microbiological Aspect of Rumen Digestion.** (Dr. A. C. Thaysen, Chem. Res. Lab., D.S.I.R., Teddington.)

Dr. Thaysen began by quoting an opinion hazarded by Pasteur as long ago as 1885, that if only appropriate experiments could be carried out it would probably be found that no animal could develop normally in the absence of an intestinal microflora. The general concept as it related to the ruminant was of the existence of a great variety of micro-organisms, including protozoa, which subsist on the foods ingested by the host and convert the cellulose of plant tissues into soluble and gaseous products, notably organic acids and methane. From some of these degradation products the host is assumed to derive nutritional benefit. Experimental proof that monoses or disaccharides are liberated microbiologically from cellulose in the rumen is still lacking.

When ingested plant tissues enter the rumen of an ox or sheep they are submerged in a dense suspension of micro-organisms contained partly in the liquid portion of the rumen content and partly adhering to tissues already present there. Instantly the fresh tissues become infected with this microflora and before long a variety of cells can be observed under the microscope to have invaded the tissues and to be growing on them in a manner characteristic of cellulose decomposing micro-organisms. The tissues become covered with densely packed cells, which must reproduce actively. If it is assumed that an ox ingests 2 kg. of cellulose daily, and that a total of 100 l. of liquid passes through its rumen every 24 hours, it can be calculated that a minimum of 404 g. of dry microbial substance, equivalent to 180 g. protein, 80 g. carbohydrate and 8 g. of fat, with a total of about 139 g. of carbon, is formed daily. It is probable that the bulk of the rumen microflora could be digested by the host.

In opening the discussion on this paper, Mr. Frank Baker (County Technical College, Guildford) outlined in brief the methods of direct microscopic observation which he has applied during recent years to the examination of rumen and other gut contents. Samples collected *post mortem*, from a fistulated animal, or *in vitro* are fixed with formaldehyde. Rumen and other markedly heterogeneous samples are strained through muslin and the suspended components of the strained liquid segregated by centrifugation. In this way the successive fractions (*a*) the bulk of the coarser vegetable fragments and the rumen ciliates, (*b*) the larger, and (*c*) the smaller bacterial species can be obtained.

An essential part of the microscopic technique is the examination of wet iodine preparations. In these the presence of an entire class of micro-organisms, the iodophile species, which have never been isolated in pure culture, can be disclosed. Such micro-organisms can accumulate in sufficient numbers to give a reaction visible to the naked eye. Wet preparations of bacteria which do not react with iodine can be obtained by irrigation with erythrosin or Bengal rose and yield far more data than do dried films. Dry preparations are useless in the case of protozoa also.

Counts are made in iodine solution using a double cell with a Burker ruling. A set of 60 squares is counted in each of the two cells under a 4 mm. dry apochromat.

Cellulose decomposition can be studied in plant residues, which have been spun down, washed, and mounted in a medium of high refractive index, by staining with a saturated solution of mercuric in potassium iodide, to which 0·5 per cent. crystalline iodine has been added, and examining, with an intense light source, under the polarising microscope. Cellulose is birefringent, and decomposition is accompanied by loss of double refraction. The enzymatic cavities excised are seen as black regions or pits upon the luminous surfaces of the walls. The responsible micro-organisms, species of iodophile bacteria, can be seen in the interior of the cavities merely by uncrossing the nicols. The presence of a vast microbial population is thus disclosed, the role of whose members as agents of decomposition and thus of synthesis would otherwise escape attention. None of these organisms makes any appearance on plates or on mineral salt media to which cellulose has been

added. Cellulosic substrates treated with chlorzinciodine or a tetragonium dye such as Congo red or azo-blue showed dichroism under a single nicol so that cell-wall structure can be distinguished with ease from other stained material.

(2) **The Formation of Protein.** (Dr. J. A. B. Smith, Hannah Dairy Research Institute, Kirkhill, Ayr.)

Dr. Smith said that during the last 40 years the claim had frequently been made that for some animals a portion of the dietary protein required to maintain normal health and growth can be replaced by substances containing non-protein nitrogen (N.P.N.). The earlier work supporting or refuting the claim had been reviewed by H. A. Krebs ((1937.) *Tierernahrung.* **9.** 394) and by E. C. Owen ((1941.) *J. Dairy Res.* **12.** 213). The subject had come to be regarded as of importance in Britain only when the large-scale manufacture of N.P.N. compounds, such as urea from atmospheric nitrogen, had become possible and when it appeared that war might again curtail the supplies of available feeding-stuffs. Dr. Smith reviewed practical feeding trials which had been carried out on milk production at the Hannah (Owen *et al.* (1943.) *Biochem. J.* **37.** 44) and at Wisconsin (Rupel *et al.* (1943.) *J. Dairy Sci.* **26.** 647), on growth of calves and heifers at Shinfield (Bartlett and Cotton. (1938.) *J. Dairy Res.* **9.** 263) and elsewhere, on wool and meat production in sheep, and on N.P.N. in the diet of non-ruminants, concluding that (1) urea can be utilised by ruminants for the production of milk, meat and wool; (2) the proportion of nitrogen supplied as urea should not exceed 40 per cent., while 30 per cent. would probably be a more efficient level to adopt; (3) sufficient readily available carbohydrate must be present in the diet to balance the nitrogen, from which it follows that urea may prove to be of particular value in areas where the grain is specially rich in carbohydrate and poor in protein. Dr. Smith next discussed recent evidence supporting the theory usually advanced to explain the utilisation of N.P.N. by ruminants (see Pearson and Smith. *Biochem. J.* (1943.) **37.** 142, 148 and 153) and the isolation of synthesised protein from rumen liquid, concluding (1) that protein synthesis and hydrolysis can proceed simultaneously in the rumen and that either can proceed simultaneously according to the conditions existing at the time; (2) readily available carbohydrate (starch or simple sugar) must be present in sufficient amounts and the diet adequately balanced if N.P.N. is to be converted to protein.

(3) **Synthesis of Vitamins by Micro-organisms of the Alimentary Tract.** (Dr. S. K. Kon, National Institute for Research in Dairying, Shinfield.)

Dr. Kon referred to the experiments carried out in South Africa 30 years ago by Sir Arnold Theiler, Dr. H. H. Green and Dr. P. R. Viljoen, who were unable to produce vitamin B deficiency in cattle and who suggested that bacterial synthesis in the alimentary tract could satisfy the animal's requirements. Detailed studies carried out in the U.S.A. during the past 20 years have confirmed the ruminal synthesis of riboflavin, nicotinic acid, pantothenic acid, vitamin B_6 (pyridoxin), and biotin, as well as of vitamin K. The position of vitamin B_1 is curious, for although the cow is independent of an exogenous source of it, not all workers have been able to find any evidence of its synthesis in the rumen. Like vitamin C, it may be synthesised outside the rumen, or possibly there is rapid absorption.

In the case of the rat, coprophagy may overcome the effects of a vitamin B deficient diet, and there is considerable evidence that the normal intestinal flora are capable of synthesising many members of the vitamin B complex. Apparently the architecture of the rat's gut and the processes of digestion allow of the formation, but not of the uptake, of substantial quantities of the vitamin B complex, though the position is probably different regarding vitamin K. Dr. Kon then dealt with the phenomenon of refection in rats, and with the normal practise of coprophagy in the rabbit (*vide Vet. Rec.* (1940.) **52.** 259), and stated that evidence has been accumulating that the synthetic activities of intestinal bacteria supply their non-ruminant hosts with a certain modicum of various vitamins even in the absence of frank refection, and that the observed exogenous requirements of various species for different members of the vitamin B complex and also for vitamin K represent only the excess of the true needs over the amounts derived from exogenous sources. Evidence for this has come mainly from recent experimental work with sulphonamides and with analogues of different vitamins. Thus sulphapyridine has been found to interfere with the curative action of nicotinic acid in deficient dogs, while sulphaguanidine and succinyl-sulphathiazole decrease the growth rate of rats subsisting on purified synthetic diets supplemented with crystalline vitamins known to be essential. Some of the deficiency symptoms produced may be overcome by adequate dosage with liver preparations or with folic acid. An indication of the complexity of the problem is the fact that pantothenic acid deficiency induced by sulphonamides has been cured by administration of biotin and a folic acid concentrate. Recently it has been found that a mixture of amino-acids adequate as a protein substitute for rats becomes inadequate in the presence of succinyl-sulphathiazole.

There is now evidence that part of the vitamin B_1, riboflavin and nicotinic acid requirements of man are synthesised in the intestines.

(4) **Production of Volatile Acids in the Rumen.** (a) **Formation and Absorption of Volatile Acids in the Rumen.** (Mr. A. T. Phillipson, Mrs. R. A. Marshall and Dr. S. R. Elsden, Agricultural Research Council, Unit of Animal Physiology, Cambridge); (b) **Utilisation of Volatile Acids.** Sir Joseph Barcroft, F.R.S., Agricultural Research Council, Unit of Animal Physiology, Cambridge.)

The speakers said that the characteristic feature of digestion in the stomach of the ruminant is fermentation of carbohydrate, a process that occurs in the rumen and thus precedes peptic digestion. The degree of digestion that takes place in the rumen is considerable and it has been estimated that of the total cellulose digested by the animal 85 per cent. is accounted for in the rumen.

The principal end product of fermentation in the rumen appears to be a mixture of acetic, propionic and butyric acids and of these acids acetic predominates. This mixture is characteristic not only of the rumen but also of other organs in which fermentation occurs such as the large intestine of the horse, pig, rabbit and rat. The total quantity of lower fatty acids present in the rumen of sheep taken straight from pasture is in the region of 60 grammes when expressed as Gm. acetic acid.

The fatty acids are absorbed from the organs in which they are formed; thus in the sheep they are absorbed principally from the rumen, reticulum, omasum and caecum, rather than from the abomasum and small intestines, in which organs little is present in the ingesta. The quantity absorbed in this way is somewhere in the region of 100 grammes a day, enough to account for one-sixth of the carbohydrate digested.

Both acetic and propionic acids are destroyed when included in the fluid perfusing the isolated rabbit's heart. The quantity destroyed compares favourably with the amount of glucose used by the heart under the same circumstances. Experiments in which the individual acids are given to phloridzinised sheep confirm the fact that propionic acid produces an almost quantitative amount of extra glucose in the urine while acetic alone produces little if any extra glucose.

The flora of the rumen varies in relation to the diet, for the ability of the organisms of the rumen to ferment glucose changes when sheep pass from a diet of poor hay by various stages to a full production ration. In such animals all degrees of fermentation of glucose have been found ranging from inability to ferment glucose to the rapid fermentation of glucose which is complete within two hours and which is characteristic of a rumen in which a pseudo yeast is abundant. The changes in the biochemical findings are allied to changes in the population of the rumen, particularly in respect of iodophilic cocci and pseudo yeast cells.

The Chairman (Dr. Wooldridge), in concluding the meeting, said that there were three major factors concerned in the problem of "The Nutritional role of the Microflora in the Alimentary Tract"—the host animal itself, the nature of the ingested material or food, and the microflora.

The animal itself affected the problem in that the shape of the alimentary tract varies considerably within the animal kingdom and the location of the actual organ wherein the major activity of micro-organisms is thought to take place varies within the tract itself. In their discussions that day they had been mainly concerned with ruminants. Here, as was brought out by Phillipson, we had microbial activity in a capacious organ preceding the true stomach or the enzymically active intestines. The bulk of the changes go on, therefore, in a relatively inactive organ, although we must not forget that the muscular mixing and the actual act of rumination will play their part. We should also remember that very large quantities of saliva pass into the rumen and that this saliva, besides being enzymically active, contains moderately large quantities of alkaline bicarbonate. Some reference was made to the horse, reminding them that bacterial digestion in that species occurred in the caecum. The capacity of the equine caecum in relation to that of the alimentary tract is comparable to that of the rumen and it is generally believed that micro-organisms play a similar part in it to that which they play in the rumen. This is at present little more than a belief and it seemed to him that, bearing in mind the changed conditions in the caecum following the passage of food first through the stomach and then the small intestine, we may find that microbial activity differs considerably from that within the rumen.

Considerable reference was made to the rat, but no reference had been made to carnivores and only passing reference to the omnivores, the human and the pig. Yet all these animals have micro-organisms normally in the alimentary tract and it is probable that, in the course of their own growth, etc., they will affect the nature of the alimentary contents.

The second major factor of the composition of the diet was an extremely important one when experimental work was being conducted upon animals, particularly the larger domestic animals. Not only did the diet vary from that of a pure carnivore to that of a strict herbivore, but we must remember the difficulties of feeding a diet of constant composition in the large amounts required for experiments extending over long periods of time for the desired number of animals. For not only is it necessary to "acclimatise" the animal to the selected diet before the experiment begins but it is also necessary to try and avoid variation due to changes in composition from one batch of a particular food crop to another and that due to a change in composition of the same crop, say pasture grass or hay, arising from the length of time it has grown, the season of reaping, the conditions of its storage, etc. It is advisable when studying microbial activity to endeavour to standardise conditions likely to affect the composition of the bacterial environment, for changes of this nature can have very marked effects upon the nature of a mixed bacterial population.

In regard to the third major condition, namely, that arising from the nature of the micro-organisms themselves, perhaps he might be permitted to comment that although most of the work reported that day had been of a comparatively satisfactory chemical nature, from the point of view of the strict bacteriologist it had been far less satisfactory. In nearly all cases, reference to the microflora had been vague and concerned largely with very mixed populations. They had not endeavoured to discuss the activities of protozoa and only slight reference had been made to yeasts. To him it would seem advisable to endeavour to discover the nature of the mixed microflora and to find out something of the effect of the isolated species upon media such as exist in the rumen. Here it seemed lay a possible extension of the important work carried out by Dr. Smith and the Cambridge School. If portions of rumen contents could be removed, sterilised and reinoculated with single and mixed known cultures of previously isolated microflora, useful results should be obtained that could definitely be assigned to the activity of the inoculated organisms. Furthermore, it must be remembered that not only can mixed populations of bacteria vary in type and number very readily with a change in the nature of this medium, but that the enzymic activities of a simple population may also change markedly during the course of its own growth, particularly if alterations in environment occur during the logarythmic phase of growth. Again, as emphasised by Dr. Thaysen, bacteria not only play their part in breaking down food products, but they also play an important role in synthesis. In this connection, it should be remembered that the composition of the contents of the alimentary tract varies considerably as regards its content of bacterial bodies in that the proportion is low at the oral end whereas the faeces, at least in man, are made up of, he believed, over 80 per cent. living and dead bacterial bodies. The utilisation of bacterial bodies may obviously be an important factor in digestion.

He had not dealt specifically with the important work reported to them that day, not because he did not appreciate its value, but because he felt it wise to stress the difficulties inherent in this work, particularly with larger animals. These animals were known through long years of careful husbandry to show a great individual idiosyncrasy and it would seem highly important in all this work that experiments should be made upon an adequate number of animals. Despite the financial difficulties, the teachings of statistics as applied to biological experiments remained highly important if sound deductions were to be formed. The need was to overcome these financial difficulties.

All would agree with him that the work they had discussed had been most interesting, highly significant and full of promise. It certainly merited the granting of every facility for its continuation under the best experimental conditions.

STOCK-BREEDING IN MAURITIUS

In December, 1943, a group of people interested in stock-breeding in Mauritius formed the "Breeders' Club" with a very small capital (about Rs. 10,000). During the first year of its existence, the club sold to its members foodstuffs to the value of Rs. 100,000 and submitted to the Government a very valuable report on the milk industry in the Colony. It also introduced a certain number of fowls and breeding stock into the country. Membership of the club during this period rose from about ten to over 800.—*Colonial Office News Service.*

ABSTRACTS

[I.—The Nutrition of Calves: A Review. Savage, E. S. & McCay, C. M. (1942.) *J. Dairy Sci.* **25**. 595-650. (Cornell Univ., Ithaca, N.Y.). **II.—Certain Dietary Factors Essential for the Growing Calf.** Lundquist, N. S. & Phillips, P. H. (1943.) (*Ibid.* **26**. 1023-1030. (Coll. Agric., Univ. Wisconsin, Madison.) **III.—The Effect of Diet on the Vitamin A Content of the Bovine Foetal Liver.** Braun, W. & Carle, B. N. (1943.) *J. Nutrit.* **26**. 549-554. (Div. Vet. Sci., Univ. California, Berkeley.)]

I. An extensive review based upon 280 references and also upon unpublished data.

Pre-natal development and post-natal mortality.—Little is known of the effect, obviously important, of maternal diet. The calf is born with a liver with a relatively low content of vitamin A (and probably, although this has not been demonstrated, of vitamin E), but with a relatively rich store of iron and copper. It is also born without certain of the serum globulin fractions, but these rapidly make their appearance following the ingestion of the colostrum. Colostrum varies widely in chemical composition. Under experimental conditions, the percentage mortality among calves deprived of colostrum has been extremely high, while under field conditions in Missouri it has been reported to be 32 per cent. Colostrum is a rich source of the fat-soluble vitamins.

Diseases and mortality of calves.—Various figures are given to illustrate the high percentage of losses occurring among young calves in dairy herds. The personal opinion of W. L. Williams is quoted, *viz.*, that losses in New York State are probably greater than those encountered by L. Jordan in Ayrshire. Housing, as well as nutrition, appears to be an important factor in the causation of such losses.

Digestion in the normal calf.—Milk fed to calves from pails may enter the rumen to a limited extent, but that fed from nipples never does so. Gastric secretion does not appear to be markedly influenced by psychic factors. The idea that foods do not undergo any change while passing down the oesophagus may have to be revised in the light of the recent sham-feeding trials of G. H. Wise, P. G. Miller & G. W. Anderson (1940, *J. Dairy Sci.*, **23**, 997–1011), in which it was found that milk stimulated a flow of saliva in calves. When the mixture was collected from an oesophageal fistula its viscosity was increased and its pH lower than that of milk or saliva. Sham-fed milks contained more bacteria and were more stable since the fat rose more slowly.

Protein requirements.—Since the protein requirement of the calf can be supplied in part by simple compounds such as ammonium salts and urea, the term "nitrogen requirement" might be more appropriate. Much work needs to be carried out to establish the optimum conditions for developing and maintaining the best flora in the rumen of the growing calf in order to obtain the maximum value either from plant proteins or from simple nitrogenous compounds. There appear to be breed differences in the optimum protein requirements of calves (W. W. Swett *et al.*, 1924, *J. Dairy Sci. and Mo. agric. exp. Sta. Res. Bul.*, No. 66).

The utilisation of carbohydrates.—The question as to whether roughage is essential for the calf is complicated by the fact that there are unidentified factors essential for herbivora. S. W. Mead & H. Goss (1935, *J. Dairy Sci.*, **18**, 163–169) reared calves and maintained them alive for six years without roughage in the form of hay.

Fat utilisation by calves.—It was reported by Crusins as long ago as 1859 that the food value of milk for calves was doubled if the fat were left in. Many feeding trials set up to investigate the ability of other fats or fat-rich meals (*e.g.*, peanut oil, peanut meal, flaxseed meal, cod-liver oil, tallow, lard) to replace butter fat have since been reported, but there has been little fundamental work upon the digestion and absorption of fat by calves. Cod-liver oil, although it does not appear to produce injurious effects in calves as in some other herbivorous species, has certain disadvantages.

Fat-soluble vitamins.—Vitamin A is indispensable for growth, and in its absence secondary infections appear as well as many apparently primary pathological changes, including optical lesions, oedema, changes in the ruminal epithelium, and possibly hepatic and renal lesions. Vitamin D is also highly important to the calf, in which rickets develops as in other young ruminants. The importance of vitamins E and K for the calf requires investigation.

Water-soluble vitamins.—It has been reported that calves were reared from birth upon diets which produced scurvy in guinea-pigs (but see II). Once ruminal function has been established, the calf appears to be capable of synthesising many of the different B vitamins. Wegner *et al.* (1940, *Proc. Soc. exp. Biol., N.Y.*, **45**, 769–771) have reported ruminal synthesis in the calf of vitamins B_1, B_6, riboflavin, nicotinic acid, and biotin. In early life the calf presumably requires an exogenous supply of B vitamins (see II).

Inorganic elements.—Rusoff (1941, *Fla. agric. exp. Sta. Tech.*

Bul., No. 359) found 15 trace elements, *viz.*, Al, Ba, B, Cr, Co, Pb, Mn, Mo, Ni, Ag, Sr, Sn, Ti, V and Zn, but none of the following: Sb, Be, Bi, Cd, Cs, La, Li, Th, W, Y and Zr. Little is known as to the role played by those elements he detected, although Cu is believed to supplement Fe in haemoglobin synthesis and Co deficiency is believed to be at least one factor in "salt sickness." I deficiency is known to lead to the birth of hairless or dead calves, or to enlarged thyroids in early life. The requirement for NaCl seems to vary with the diet. Ca and P requirements have been studied fairly extensively, especially at Onderstepoort (see Theiler, 1934, *Vet. J.*, **90**, 143–190, for a review of the Ca and P requirements of growing calves when vitamin D is not a factor). Mg is obviously important to the calf, but the subject requires detailed study.

Water consumption.—It is probably desirable that calves should be allowed free access to water even when milk is being fed. McCandlish in 1919 reported that calves consumed 4 lb. of water daily during the first month of life, and 8 lb. daily during the second.

II. Attempts were made to rear newborn calves on a basal diet of skim milk without allowing access to colostrum. Such attempts succeeded with Friesian calves, but not with Jerseys, Guernseys and Brown Swiss: calves of these three breeds could be raised on the basal diet suitably supplemented provided they were left with their dams for the first two or three days. The blood level of vitamin C (ascorbic acid) was found to be much higher at birth than in older calves, but the decline was rapid. Evidence was obtained that certain suppurative conditions, including enlargement of the navel, were associated with low vitamin C status, and could be relieved by vitamin C therapy (0·25 to 0·50 g. daily), an investigation which was extended to field cases. Oral vitamin C therapy was effective only up to 10–12 days of life, after which ruminal destruction presumably occurred. It seemed that bodily synthesis of vitamin C normally began during the third week of life. Nicotinic acid was also found to be a dietary essential for the calf during the early days of life, deficiency being associated with scour. In the presence of adequate blood levels of vitamin A, daily doses of 50–100 mg. nicotinic acid were found to be effective in curing experimental and some field cases of scour. Pantothenic acid did not seem to be of value in combating scour.

III. During the course of experiments involving infection of the dams with *Br. abortus*, the opportunity arose to determine foetal liver vitamin A reserves when maternal intakes of the vitamin varied considerably. The foetuses examined were aborted by cows on four different types of diet, *viz.*, non-irrigated natural pasture all the year round, without supplement (P); the same pasture + dosage twice weekly with 400,000 I.U. of vitamin A as shark-liver oil during the winter months—(PA); barn-fed on a vitamin A-deficient diet of beet-pulp, cottonseed meal and rolled barley during the winter months—(B); barn-fed as in (B) but with the same vitamin A supplement as in the (PA) group—(BA). The foetal liver vitamin A reserves were as follows, expressed in I.U. per g.:—

Group	*No. of calves*	*Range*	*Mean*	*Median*
(P)	3	6·1–7·4	6·6 ± 0·34	6·2
(PA)	4	6·8–15·1	10·7 ± 1·41	9·5
(B)	7	0·0–3·9	1·7 ± 0·58	2·5
(BA)	5	10·1–24·2	14·1 ± 2·48	10·3

It was apparent, therefore, that foetal liver vitamin A reserve, while always of a low order, was a direct reflection of maternal diet.

A. N. W.

* * * * *

[Studies on Bovine Gastro-intestinal Parasites. VIII.—Effects of a Low Plane of Nutrition on Immunity to the Stomach Worm *Haemonchus contortus*. Mayhew, R. L. (1945.) *Amer. J. vet. Res.* **6**. 21.]

The author briefly discusses some work which suggests that deficient diets render animals more susceptible to nematode infestations. The author himself (Mayhew, R. L. (1941.) *Amer. J. Hyg.* **33**. 103) claims to have shown that a definite immunity to further infestation with *Haemonchus contortus* is developed by bovines after a previous infestation with this species. For the work described in this paper the author used six calves. For the detailed observations made upon them the paper itself must be consulted. In general the procedure was to administer larvae of *Haemonchus contortus* to the calves in order to establish in them resistance to further infestation and to verify the existence of this resistance by further administration of *Haemonchus* larvae some three months later. This immunisation of the calves is described in the author's earlier paper (*loc. cit.*). The resistance to further infestation was adjudged by egg counts made by methods which will be published later. The calves were then put on a diet of "cotton seed hulls" only, except that ½ to 1 pint of commercial calf concentrate was also given to encourage the calves to eat. Usually they readily ate this poor diet, although they got tired of it. After about a month on it they usually showed definite effects of the poor diet (*e.g.*, loss of weight and muscular weakness), but none of them showed any evidence of vitamin deficiency. In this connection the author refers to the work of Wegner, M. L., Booth, A. N., Elvehjem, C. A., and Hart, E. B. ((1941.) *Proc. Soc. Expt. Biol. Med.* **47**. 90), on the synthesis of "vitamin B" in the rumen. When this evidence of the effect of the poor diet was obtained, *Haemonchus* larvae were again given to find out whether the poor diet had broken down the resistance to further infestation. The viability of the *Haemonchus* larvae was confirmed by giving them to calves kept on normal diet. If the strength of the calves declined too rapidly, they were given a small amount of hay and concentrate to prevent death.

In three of the six calves the egg counts showed no increase in the degree of the infestation after feeding the poor diet. In the other three there was a slight increase. Mayhew (*loc. cit.*) has, however, shown: (1) that a slight increase occurs in calves kept on good feed; and (2) that it is never possible to establish as heavy an infestation by "reinoculation" after immunity has been established.

G. L.

Questions and Answers

"Questions and Answers" will be published on alternate weeks.

The submission of questions for inclusion in this column will be welcomed: they can relate to any aspect of veterinary work. For purposes of record, each question is numbered, and those submitting questions are required to furnish (not for publication) name and address.

Answers to readers' queries represent exclusively the personal opinions of the writers, and criticism of the replies will be appreciated.

All communications should be addressed to the Editor.

After-Treatment for Retained Placenta

Q. LXXXIII.—*What is the best after-treatment for retained placenta to avoid metritis, particularly a pyogenes infection?*

A.—Retention of the placenta must always be considered as a serious risk to subsequent fertility and possibly to life itself. Manual examination should always be made with full antiseptic precautions after a thorough cleansing of the vulva area. Where the cow or heifer is showing no constitutional symptoms, interference is undesirable, and manual removal of the membranes is to be deprecated at any time unless one can be quite certain that complete removal can be effected without causing injury. The optimum period for manual removal varies considerably, and is rarely prior to the fifth day. If, on examination, the conclusion is reached that complete removal cannot be effected, the writer recommends in the case of cows or heifers showing constitutional symptoms (temperature, inappetence, etc.) douching with hypertonic saline or a very weak antiseptic solution and then syphoning out the fluid, either by use of a rubber tube (stomach tube type) or by repeated use of cotton wool swabs; then insert antiseptic pessaries such as sulphapyridine 3 gms., sulphanilamide 11 grs. in a soap base (May & Baker) or sulphonamide 3 drms., pepsin B.P. 15 grs. in an Ol. theobrom. base (Willows & Co.), in each horn of the uterus. An injection of 20 to 40 c.c. of stilboestrol dipropionate appears to be of value in such cases and a precautionary course of sulphanilamide also is advised.

Examination of the udder on the occasion of each visit is recommended in view of the not infrequent association of mastitis with retained foetal membranes. The douching and pessaries can be repeated daily if necessary and treatment continued symptomatically.

The occurrence of "whites" after retention is very common. The writer recommends the insertion of pessaries of the type described above directly the membranes are voided or removed, this being a routine in known pyogenes infected herds. Subsequently it is inadvisable, in his experience, to irrigate with iodine or any other antiseptic for a period of three weeks, during which time the discharge tends to change from a brownish red catarrhal to a purulent one which can be removed from the vagina from time to time by douching with bicarbonate of soda solution, 1 oz. to the gallon, or a weak non-irritant antiseptic solution.

In this practice there is carried out a routine irrigation of all cases of retention three weeks after removal of the membranes, using 6 oz. of 1 in 500 iodine, repeating in 10 to 14 days if discharge still persists. Records show that infertility following retention is greatly reduced if this routine is practised. Too frequent irrigation appears to be better avoided. Vaginal dressings with acriflavine in liquid paraffin 1 in 1,000 or "Bovoflavine" (Bayers) appear to be of considerable value subsequent to irrigation in cases of whites associated with some degree of cervicitis where no accumulation of discharge is present in the uterus.

Ruminant Digestion

Q. LXXXIV.—*What is the physiological explanation of the fact that a cow (a) cannot digest whole oats; (b) can digest crushed oats; (c) cannot digest oats when crushed into a flour?*

The foregoing seems to indicate that the physical condition, like the palatability of food, affects the digestibility of food and that it requires more than the calorific value and chemical analysis of food to assess its value as an article of diet.

A.—(*a*) Whole oats cannot be digested by the cow because these tend to pass freely into the reticulum and rumen without the outer case being subjected to bacterial digestion in the rumen which is the first essential to the complete breakdown of the oat grain.

(*b*) Crushed oats will not only more readily disintegrate in the ruminal contents but are more likely to be caught up in fibrous material already present there and be subjected to digestion in the usual way, the outer case in this instance failing to prevent the breakdown of the contained starch.

(*c*) As far as is known, cows are quite capable of utilising oats when ground into a flour. Possibly the questioner is thinking of wheat flour; this is likely to form a thick paste and break up with more difficulty in the rumen than other forms of flour, but even this is only a supposition.

It is quite true that the actual physical nature of the food plays an important part in the success of digestion and cannot be overlooked.

* * * * *

Hydrops Amnii in the Bitch

Q. LXXXV.—*Cocker spaniel bitch, ten years old, presented with a history of polyuria—otherwise normal. Tested urine, found traces of albumin, and prescribed appropriate treatment. Four days passed without alteration of the condition. Two days later she showed signs of ascites (as I thought) and the thirst was less. Two days later still, the pendulous abdomen was smaller but she was bulging at the sides and this suggested to me a uterine abnormality (pyometra?). To-day she was so distressed and ill that the owner suggested destruction. On* post-mortem *examination I found five foetuses (presumed five weeks old) and a colossal amount of fluid in the uterus. This, I suppose, is a conditon of hydrops amnii. If so, what is the cause? Also what is the diagnosis—if any—and the treatment? Is the condition rare?*

A.—Assuming your supposition was correct, the cause is unknown. The writer has not encountered a case in over 30 years of practice, and consultation of veterinary text-books reveals no mention of the condition in the bitch. In the absence of the characteristic "thrill" of ascites, the presence of free fluid in the peritoneal cavity could probably have been ruled out. If the animal was showing such distress that something had to be done, it is suggested that an exploratory laparotomy would probably have been the best procedure. Alternatively, one might try the insertion of a trochar and cannula directly through the abdominal wall into the uterus. This might involve the death of the foetuses; as would a policy of inactivity. Caesarean section, or Caesarean hysterectomy, on the other hand might have saved both mother and offspring—provided the latter had reached full term. In the present case, it is assumed they had not. So little is known of this disease that it is difficult to answer the questions; but there may be some readers of this note who can throw more light upon the matter.

[There are many references in the literature to the occurrence of this condition in bovines—*e.g.*, Williams ("Diseases of the Genital Organs"), who deals extensively with its causation, while Crosfield (*Vet. Rec.* **56**. 4) records the treatment of a case of hydrops amnii in the cow with stilboestrol. Though ultimately the cow died, the dropsy was promptly relieved and so, comments the author, "it seems worthy of more extended trial."—*Editor.*]

* * * * *

Artificial Insemination of Bitches

Q. LXXXVI.—*Is it practical to employ artificial insemination with bitches and, if so, are there any Kennel Club restrictions applicable to the progeny?*

A.—It is practical to employ artificial insemination with bitches and a case was reported in *The Veterinary Record*, page 344, 1944. At present the Kennel Club will only register progeny resulting from this technique provided the operation has been previously sanctioned by the committee of the club. It is also necessary to produce a veterinary surgeon's certificate as to the necessity and validity of the procedure.

Artificial insemination is not likely to become a popular practice for the following reasons:—

(1) Adequate numbers of good class sires in all breeds are available and the transport of a bitch to visit any particular dog is comparatively easy.

(2) Semen has to be obtained by means of masturbation, a practice which is not comparable with the use of the artificial vagina and has far greater disadvantages.

(3) The cervical canal of the bitch is so small even during oestrus that intra-uterine injection of semen is not practical and the injection of semen into the anterior vagina has no advantage over natural coitus and is, therefore, unlikely to be useful in overcoming sterility.

The procedure may, however, prove useful in the following types of cases:—

(*a*) Dogs of good type and pedigree which are impotent due to accidental deformity, *e.g.*, fracture of the os (penis) or from hormonal disturbances.

(*b*) Bitches of breeds which exhibit a degree of sexual frigidity and in which forced matings may be the rule, *e.g.*, Chows, etc.

* * * * *

Scientific Films

Q. LXXXVII.—*Can you please give me any information regarding the hiring of scientific films of veterinary and medical interest?*

A.—The veterinary profession was early to appreciate the value of motion films in the demonstration of various surgical techniques for educational purposes. Under the guidance of such well-known veterinary surgeons as the late Sir Frederick Hobday, Dr. McCunn and Professor Wright, a series of films was produced showing subjects of surgical interest. Further information regarding these films, which are all of the 16 mm. type, may be obtained from Kodak, Ltd., Kodak House, Kingsway, W.C.2, and from whom they may be hired for a short period for moderate fees. Messrs. Kodak have also at their disposal a range of approximately 150 medical motion films. These films are intended for circulation within the limits of the medical profession and their hire can be negotiated by or on behalf of members of that profession. Kodak, Ltd., are not renters within the meaning of the Cinematograph Acts and the showing of Kodak medical library films to the public is therefore prohibited.

More recently a series of films of veterinary interest depicting the control of contagious abortion, tuberculosis and the production of clean milk, etc., have been produced by I.C.I. and these are admirably suitable for showing to lay persons.

The writer believes that motion films are of very great value in depicting subjects of extreme importance to the clinician and wonders whether the time will not soon be opportune to form local societies of veterinary practitioners where films may be regularly shown and discussed. In his own particular case he envisages the early formation of a local society where members will be medical practitioners and dentists as well as veterinary surgeons, and where scientific films of comparative interest may be discussed.

* * * * *

Correspondence

B. haemolytic streptococcus Infection of Dogs

Sir,—Your feature, "Questions and Answers," in our opinion forms a useful addition to the columns of the *Record*. In your issue of February 24th, 1945, which has just reached Mukteswar, there are questions and answers relating to *B. haemolytic streptococcus* infection in dogs, to which we would draw attention. We submit that the answers given are hypothetical and incorrect and therefore misleading. Moreover, to the question "Has there been a recent publication concerning this trouble?" no answer at all is given. We therefore start by giving the following references:—

1. Stafseth, H. J., Thompson, W. W., and Nev, L. (1937.) *J. Amer. vet. med. Ass.* **90**. 769.
2. Hare, T., and Fry, R. M. (1938.) *Vet. Rec.* **50**. 213.
   ——. (1938.) *Ibid.* **50**. 1537.
3. Stafseth, H. J. (1940.) *J. Amer. vet. med. Ass.* **96**. 230.
4. Minett, F. C., and Ellis, A. B. (1940.) *Vet. J.* **96**. 438.

The work of all these investigators shows that in the dog there does exist beyond reasonable doubt a pathological condition caused by haemolytic streptococci and that this condition appears under various clinical manifestations depending on the particular localisation of the organism, *viz.*, tonsillitis, pneumonia, skin disease, disorders of the female reproductive tract, death of puppies. The organism can also be isolated from prepuce of dog and milk of bitch. With regard to the reproductive troubles mentioned, haemolytic streptococci belonging to Lancefield's groups G or C can be cultivated in enormous numbers from vaginal swabs and from the tissues of the dead pup. We really see no more reason for doubting that these streptococci are the causal parasites of the condition than there is for doubting that haemolytic streptococci cause scarlet fever and sore throat and erysipelas in man, that similarly, streptococci cause strangles in horses or that streptococci cause mastitis in cows. Haemolytic streptococci do not exist in these lesions for fun, nor are they saprophytic bacteria as are, for instance, some kinds of staphylococci, Proteus, etc.

We do not know how seriously to take the person who wrote these answers. The answers seem to be rather provocative, with something of the tongue-in-the-cheek flavour, but it is somewhat of a relief to note that such answers "represent exclusively the personal

opinions of the writers." Nevertheless, answers such as these are harmful, since they cause unnecessary confusion and ignore facts. Such statements as "no good evidence that the *B. haemolytic streptococcus* causes the syndrome associated with abortion, death of suckling puppies," "*B. haemolytic streptococci* can be isolated from the vaginas of most healthy bitches," "it would be a task of some magnitude to find one [vagina of healthy bitch] free from their presence," are, we submit, not borne out by bacteriological evidence. Other statements such as "heredity, nutrition, hormone dysfunction may all play a part," "dogs have a fairly high resistance to infection with *B. haemolytic streptococcus*," are vague and hypothetical, largely imaginary, and savour of the text-books of former times. They are as hypothetical as the idea once suggested that these deaths of pups are due to "acid milk."

While we will readily grant that much more remains to be known about this streptococcus disease of dogs, particularly in the matter of prevention and treatment, we feel regretfully there is something in the "complaint in the canine Press of the neglect of this condition by the veterinary profession." This complaint will continue to have weight so long as clinicians work in isolated fashion and without using the resources of the laboratory. This disease in some kennels is a problem of the first magnitude and requires the same sort of consideration as has been given, for instance, to brucellosis and mastitis in cattle.

Curiously enough, one of us (L. S.) has found this disease recently in the experimental kennel at Mukteswar and an account will be published in due course. The trouble is of the usual nature, *viz.*, existence of apparently healthy carrier bitches and dogs (reproductive tract, and tonsil), high mortality in pups, excretion of the organism in milk. There appears to be a good opportunity here to attempt eradication, and this is being done.

Yours faithfully,

F. C. Minett.
Lakshmi Sahai.

Imperial Veterinary Research Institute,
Mukteswar-Kumaun.
April 18th, 1945.

. . . . .

The Methylene Blue Test

Sir,—In *The Veterinary Record* of May 19th, 1945, in answer to Q. LXXIII *re* the methylene-blue milk test, mention is made of the use of a *standard* solution.

What is the strength of this solution and is the same strength used and the same proportions of milk and solution used in the Scotch method? In that method will ordinary room shade temperature do and must the solution be kept in the dark?

What amount of bacterial contamination is allowed in Scotland and England for tuberculin-tested and accredited milks?

Yours faithfully,

A. F. Dykes.

5, Home Farm Cottages,
Hill End, St. Albans, Herts.
May 21st, 1945.

[The standard methylene-blue solution used is in the strength of 1:30,000. For the Scotch method, tablets of a type approved by the Secretary of State must be used, which, however, give a solution of the above strength. The strength of the solution used is the same for the English as the Scotch test, but the method of carrying out the tests differs.

In the Scotch test the tubes must be kept in the dark and at atmospheric shade temperature.

In Scotland the bacterial contamination allowed for "tuberculin-tested" and "standard" milks ("standard" milk being the equivalent of "accredited" in England) is that it shall not contain more than 200,000 bacteria per millilitre and there shall be no coliform bacillus in one-hundredth of a millilitre.

In England these milks must not contain coliform bacillus in one-hundredth of a millilitre, but there is no other bacterial count, the passing of the methylene-blue test being the criterion. In practice, however, the methylene-blue test if carried out in the prescribed manner is considered to be the approximate equivalent of the bacterial count as used in Scotland and as previously used in England.

In Scotland the bacterial contamination allowed for "certified" milk is that it shall not be found to contain more than 30,000 bacteria per millimetre and no coliform bacillus in one-tenth of a millimetre.—*Editor.*]

Cattle in the Gold Coast, particularly in the Northern Territories, continue to increase, thanks to the anti-rinderpest and pleuro-pneumonia schemes of the Department of Animal Health for the Colony. In most parts, there is also an improvement in the quality of cattle, due to increased interest on the part of the owners, improved communal bulls and in some places improved husbandry. —*Colonial Office News Service.*

QUESTIONS IN PARLIAMENT

Cattle Grading (Warbles)

Sir A. James asked the Minister of Food if, in grading cattle for slaughter, consideration may be given to allotting some preference to those free from warble, so framed as to give an inducement to farmers to carry out their statutory obligation to dress against the fly.

Miss Horsbrugh: My right hon. Friend does not see his way to adopt my hon. and gallant Friend's suggestion. As regards the last part of the Question, I would refer him to the reply given to the hon. Member for Holborn (Sir R. Tasker) on May 31st last.

. . . . .

Goats

Commander Locker-Lampson asked the Minister of Agriculture whether he will issue a leaflet regarding the goat, as he has done about other animals, so that all concerned may realise that the goat does not get or give tuberculosis; and can he encourage the starting of goat clubs on the lines of pig clubs.

Mr. Hudson: The question of revising and expanding the Ministry's leaflets is under review and my hon. and gallant Friend's suggestion will be borne in mind. As to the second part of the Question, I am advised that the main limitation to the expansion of goat keeping in this country is the shortage of first-class breeding stock.

. . . . .

Living Animals (Experiments)

Mr. Viant asked the Secretary of State for the Home Department how many experiments on living animals performed under the Act 39 and 40 Vict., Ch. 77, have been reported to his Department for the years 1943 and 1944.

Sir D. Somervell: The total number of experiments performed during the year 1943 was 1,170,412, a large number of which were simple inoculations and similar proceedings, performed either on behalf of official bodies with a view to perservation of the public health, or directly for the diagnosis and treatment of disease in man or animals. I am not yet in a position to state the figure for 1944.

. . . . .

Rabbit Traps

Sir T. Moore asked the Minister of Agriculture when he proposes to withdraw permission for the use of steel-toothed traps by agricultural war executive committees.

Mr. Hudson: I assume my hon. and gallant Friend refers to the Defence Regulation which enables War Agricultural Executive Committees to authorise the setting of spring traps in the open. I shall be prepared to withdraw the Regulation only when I am satisfied that the general food position justifies that step. Authority to use these traps is, of course, restricted to cases where no other means of rabbit destruction would be effective.

CHANNEL ISLAND HERDS

Writing from St. Helier, Jersey, a Press Association war correspondent estimates that it will be at least three years before the Channel Island cattle herds are back to their pre-war position. The quality of the seriously diminished herds is believed to be better than ever before. The circumstances of the Alderney cattle are not quite clear at the moment because of the complete German control which existed.

The general slaughtering which, so far as it was official, was directed by the States, resulted in the elimination of the poorer and less productive specimens, but in recent months farmers have been obliged to part with cows in the prime of production and reproduction.

There will be milk shortage in Jersey for several years because there will be fewer heifers in milk in 1946-47.

There has been no foot-and-mouth disease on Jersey since the summer of 1940. There was much warble fly caused by cattle brought from the mainland by the Germans.

* * * * *

British agriculturists' anxiety to help Channel Island cattle breeders replenish their depleted herds is complicated by the fact that no live cow has been allowed to land in Jersey for almost a century. The objection is, however, likely to be overcome by sending back some of the animals bred on the island and imported into Britain between 1938 and 1940.

NOTES AND NEWS

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

June 18th.—Meeting of the Overseas Committee, N.V.M.A., at 36, Gordon Square, W.C.1, 2.30 p.m.

June 20th.—Meeting of the North of England Division, N.V.M.A., at Darlington (Imperial Hotel), 2.30 p.m.

June 20th.—Meeting of the Scottish Metropolitan Division, N.V.M.A., at Perth (Station Hotel), 2.30 p.m.

June 21st.—Summer Meeting of the Central Veterinary Society (*change of date from June 7th*) at the Ministry's Veterinary Laboratory, New Haw, Weybridge, 2.15 p.m.

June 21st.—Annual Meeting of the Dumfries and Galloway Division, N.V.M.A., at Dumfries (Station Hotel), 2 p.m.

July 24th.—Summer Meeting of the Eastern Counties Division, N.V.M.A., at Cambridge (Institute of Animal Pathology), 11 a.m.

June 25th.—Meeting of the Farmers' Club, Kingsway Hall, Kingsway, London, W.C.1, 2.45 p.m.

June 27th.—N.V.M.A. Committee Meetings in Edinburgh: Subcommittee on First Aid Handbook, 10.30 a.m.; Organising, 12 noon; Appointments, 2 p.m.; Finance and General Purposes, 3 p.m.

June 28th.—N.V.M.A. Meetings in Edinburgh: Joint Parliamentary and Veterinary Officers and Public Health Committee, 10.30 a.m.; **Council Meeting**, 11.30 a.m.

June 28th.—R.C.V.S. Written Examinations.

June 29th.—R.C.V.S. Written Examinations.

June 29th and 30th.—Meeting of the Pathological Society of Great Britain and Ireland, at Cardiff (Dept. of Pathology, Welsh School of National Medicine). Particulars on application to Mr. J. H. Dible, Department of Pathology, British Post-graduate Medical School, Du Cane Road, London, W.12.

July 2nd.—R.C.V.S. Oral Examinations begin.

* * * * *

PERSONAL

Marriages.—Littlewood—Auger.—The marriage took place at St. Giles' Parish Church, Oxford, on May 22nd 1945, of Hugh Kennedy Littlewood, M.R.C.V.S., Colonial Veterinary Service, Yola, Nigeria, eldest son of Mr. and Mrs. H. R. K. Littlewood, of Radlett, Herts., and Miss Margaret Elizabeth Auger, only daughter of Mr. P. W. Auger and the late Mrs. Auger, of 63, St. John's Road, Oxford. The Rev. L. B. Cross, Chaplain of Jesus College, Oxford, officiated.

Swan-McVeigh.—On March 27th, 1945, at Livingstone, Northern Rhodesia, James F. C. Swan, M.R.C.V.S., D.V.S.M., Colonial Veterinary Service, son of Mr. and Mrs. Swan, Killochries, Kilmacolm, Renfrewshire, to Sheila Patricia, daughter of Mr. and Mrs. P. A. McVeigh, of Livingstone.

* * * * *

R.C.V.S. OBITUARY

The Late Mr. H. S. Wright, M.R.C.V.S.

Mr. Henry Stewart Wright, of High Wycombe, whose tragically sudden death while attending a calving case we recorded with much regret in our last issue, was the son of a registered practitioner who left a considerable fortune, following him at High Wycombe. He was an able general practitioner, particularly gifted in large-animal work.

A number of his clients attended the funeral and a large congregation was present at the service at High Wycombe Parish Church on June 1st. The National Veterinary Medical Association, of which the deceased was a member, was represented by Mr. R. C. G. Hancock, immediate Past President, of Beaconsfield, Mr. G. Durrant (Superintending Inspector, Ministry of Agriculture), of Oxford, Messrs. John and Horace Bell, of Maidenhead, Mr. L. Pitcher, of Wooburn Green, and Mr. R. E. Ticehurst, of Maidenhead.

* * * * *

VETERINARY COUNCIL OF IRELAND

At a meeting of the Veterinary Council held on June 6th, 1945, Professor A. F. O'Dea, M.R.C.V.S., D.V.S.M., as Returning Officer reported that at the Council elections held May 18th, he declared Mr. Louis N. Gleeson, Stradbally, Co. Waterford, elected as General Elected Member for four years, Professor James J. O'Connor, 116, Morehampton Road, Dublin, as Limited Elected Member for four years, and Mr. John J. Cosgrove, Lislee House, Kildare, as Limited Elected Member for three years.

Professor William Kearney was unanimously elected President of the Council, to hold office for two years, and Mr. John A. Flynn, Chief Veterinary Inspector, Dublin County Council, was elected Hon. Treasurer.

The following Committees were appointed:—

Standing and Penal Cases Committee: The President, Hon. Treasurer and Professor A. F. O'Dea.

Finance Committee: The President, Hon. Treasurer and Professor A. F. O'Dea.

* * * * *

LEGAL NOTES

Poison-suspect Sheep Sent to Abattoir.—For offences against the Defence Regulations in respect of meat, fines and costs totalling £1,037 10s. were imposed on two brothers, both butchers at Wellington (Shropshire).

In addition one of them, Alfred Povey, of Bennetts Bank, Wellington, was sent to prison for six months on each of three summons, the sentences to run concurrently. The other defendant was John Povey, of Heath Street, Winson Green, Birmingham.

Alfred Povey, for supplying rationed food not in accordance with a buying contract, was fined £30 plus the imprisonment in relation to three offences. On each of three offences of failing to give notice of the slaughter of animals he was fined £30, and £30 on each of three charges of using an unlicensed knacker's yard.

For each of three offences of obtaining rationed food otherwise than in accordance with buying permits, John Povey was fined £200—£600 in all.

Each defendant also had to pay 75 gns. costs.

Prosecuting for the local authority (states the *Birmingham Gazette* in its report of the case), Mr. Norman Carr said that Alfred Povey acquired six ailing sheep which a veterinary surgeon found were suffering from poisoning. He sent the carcases to Shrewsbury abattoir in spite of the fact that poisoning was suspected. Four of the carcases were delivered to butchers, and two sent for manufacturing purposes.

Prosecuting Alfred Povey in regard to his illegally supplying rationed food and John Povey for possessing meat illegally purchased, Mr. Somerville-Jones, for the Ministry of Food, said that at Wellington railway station police and a food official saw someone put three sacks on the platform.

John Povey came up, and when asked what was in the sacks said it was dog meat. The sacks contained pieces of mutton.

For the defendants Mr. J. S. Bourke, K.C., said that apart from these admitted irregularities there was no evidence that either had been guilty of selling to the public meat not fit to be eaten.

* * * * *

H.M. STATIONERY OFFICE PUBLICATIONS

The undermentioned have been published recently. Copies can be purchased through any bookseller, or directly from H.M. Stationery Office.

	Price net	*Post free*
War Office:		
Message From the Army Council to all Ranks of His Majesty's Armies. *(Special Army Order No. 65.) May 9th, 1945	0 1	0 2
Statutory Rules and Orders, 1945:		
540. Animal, England and Wales. Improvement of Livestock (Licensing of Bulls) Regulations. May 11th	0 3	0 4

* * * * *

ADDRESSES OF DISEASE-INFECTED PREMISES

Foot-and-Mouth Disease:

Monmouthshire.—Gelli Farm, Llanvetherine, Abergavenny (June 6th).

Swine Fever:

Beds.—Rectory Farm, Barford Road, Tempsford, Sandy (June 6th).

Berks.—Knapps Farm, Boxford, Newbury (June 11th).

Bucks.—7, Willow Road, Aylesbury (June 6th).

Cumberland.—The Hill, Blackford, Carlisle (June 9th).

Derbyshire.—Yew Tree Farm, Old Blackwell, Derby (June 6th).

Devonshire.—Score Farm, Braunton (June 11th); Knights Farm, All Saints, Chardstock, Axminster (June 11th).

Hunts.—58, Morris Walk, Wyboston, Eaton Socon, St. Neots (June 6th).

Northants.—Hopping Hill, New Duston, Northampton (June 7th); Weedon Road Allotments, Duston (June 8th); Fulbridge Road, Peterborough (June 11th); Old Hall Farm, Thorney, Peterborough (June 11th).

Oxfordshire.—Spring Lane, Headington, Oxford, and Sandford Allotment Field, Littlemore, Oxford (June 7th).

Roxburgh.—Chain Bridge Farm, Melrose (June 6th).

Warwicks.—Barley Sheaf House, Higham-on-the-Hill, Nuneaton (June 7th).

Wilts.—The Stratton, St. Margaret's Institution, Swindon (June 11th).

Worcs.—Washingstocks, Stourbridge Road, Bromsgrove (June 5th).

Yorks.—Home Lea, Carthorpe, Bedale (June 6th).

SHEEP SCAB:

Denbighshire.—Cefn Bach Farm, Llansannan, Denbigh (June 8th).

* * * * *

CHANGE OF EMPHASIS IN FARMING

Mr. R. S. Hudson, Minister of Agriculture, speaking at last week's meeting of the Council of Agriculture for England, said that the target for livestock at which it was desired to aim up to 1946-47 was an increase in dairy cows from 2,800,000 in 1944-45 to 2,870,000 in 1946-47; in other cattle and calves from 4,400,000 to 4,750,000; in sheep from 12,600,000 to 15,000,000; in pigs from 1,630,000 to 2,500,000; and in poultry from 32,900,000 to 41,000,000. In terms of human food this meant that it was aimed to increase livestock products in the period 1944-45 to 1946-47 as follows: Milk for human consumption from 1,315,000,000 gallons to 1,490,000,000 gallons; beef and veal from 352,000 to 384,000 tons; mutton and lamb from 104,000 to 116,000 tons; pig meat from 112,000 to 200,000 tons; and eggs from 73,000 tons to 100,000 tons. The change of emphasis from cereals to livestock was not only in the national interest but also in the long-term interests of agriculture itself, because predominantly we were primarily suited to the production of livestock and livestock products.

* * * * *

EAST SUSSEX CATTLE BREEDING DEMONSTRATION

What the *Sussex Express* of June 1st describes as one of the best arranged and most instructive demonstrations on cattle breeding ever held in East Sussex, took place at the Racecourse, Plumpton, recently. It was attended by about 1,000 farmers and others interested in cattle from all parts of the county and beyond.

The demonstration was held under the auspices of the East Sussex War Agricultural Executive Committee, and some of the finest examples of pedigree cattle in Sussex had been lent to them for the occasion. Each exhibit was thoroughly described by Mr. W. A. Stewart (Principal of the Northamptonshire Institute of Agriculture).

Mr. Stewart emphasised the great importance of milk recording. In East Sussex, he said, there were about 2,000 milk producers, and the membership of the Milk Recording Society was about 550. Compared with some other counties this was a good proportion, but it was not good enough.

During the afternoon, a talk on "Artificial insemination" was given by Mr. S. L. Hignett, of the Wellcome Research Station, and Mr. W. H. Steele-Bodger (Past-President of the National Veterinary Medical Association) spoke on "Infertility in the dairy herd."

Mr. Hignett pointed out that there were two great advantages to be derived from a widespread use of artificial insemination in cattle breeding in this country. First and foremost, it meant an improvement in livestock; and secondly, it greatly assisted in the control of disease. It was not a cure for all breeding troubles. For instance, an infertile cow was no more likely to get into calf by artificial insemination than by natural mating, but one disease in particular—trichomoniasis—which had spread like wildfire since it was first discovered in this country in 1935, would never arise if the artificial insemination method was used. He pointed out that in all probability an artificial insemination centre would be set up at Frant, if certain difficulties were overcome.

Mr. Steele-Bodger referred to the value of keeping accurate breeding records by means of which infertility could be controlled. There were many causes of infertility, some physiological and some pathological. He pointed out that infertility was responsible for the loss of 110,000,000 gallons of milk per year, and contagious abortion was responsible indirectly for about half the cases of pathological infertility.

* * * * *

The Minister of Agriculture has issued a notice advising cattle owners, where practicable, to use a suitable dressing on cattle visibly infected with warbles, but he does not propose to reintroduce the compulsory Order this year.

* * * * *

Call and associates of the Mayo Clinic report (*Am. J. Clin. Path.*) two cases of endocarditis due to brucellosis and express surprise that the condition is not reported more often than it has been in the past "in view of the frequency of Brucella infections in the general population."—*Vet. Med.*

SCIENCE AND AGRICULTURE

Closer links between the agricultural scientist and the farme are being forged by the Agricultural Improvement Council set u by the Ministry of Agriculture. Dr. W. K. Slater, the Council's chief technical officer, spoke recently of the work which is in hand.

The Council has met every two months under the chairmanshi of Sir Donald Fergusson, keeping in touch with the Agricultura Research Council on the one hand and the Ministry of Agricultur and its technical development committees in the counties on th other.

The two Councils have jointly arranged for surveys covering soi science, horticulture, plant breeding and genetics, animal breedin and nutrition, poultry research, and plant pathology to ensure tha science keeps step with the needs of practice and that the prove results of research are brought quickly to the notice of farmers.

* * * * *

SCHEME FOR THE CONTROL OF DISEASES OF DAIRY CATTLE

STATEMENT SHOWING THE NUMBER OF UNDERTAKINGS NOTIFIED TO THE MINISTR OF AGRICULTURE DURING THE MONTH ENDED MAY 31ST, 1945

County	Undertakings Notified		Total Undertakings		
	During Month	Previously	Number	Number of Cattle	
				Cows	Heifers
ENGLAND					
Bedford	—	38	38	918	523
Berks	—	99	99	3,372	2,107
Bucks	—	98	98	3,214	1,876
Cambridge	—	13	13	334	192
Chester	—	394	394	12,956	4,479
Cornwall	—	4	4	72	75
Cumberland	—	63	63	1,588	1,355
Derby	—	335	335	9,576	5,388
Devon	3	298	301	4,503	2,714
Dorset	—	68	68	2,117	1,119
Durham	—	285	285	6,277	2,203
Essex	1	246	247	8,885	5,257
Gloucester	—	101	101	2,921	1,700
Hampshire	2	382	384	10,622	7,497
Hereford	—	19	19	362	216
Hertford	—	79	79	2,405	1,455
Hunts	—	13	13	475	302
Isle of Ely	—	2	2	58	29
Isle of Wight	—	14	14	252	127
Kent	2	171	173	4,441	2,528
Lancs	—	197	197	5,676	1,784
Leics	—	103	103	2,587	1,818
Lincs (Holland)	—	3	3	25	11
Lincs (Kesteven)	—	23	23	320	168
Lincs (Lindsey)	1	108	109	2,073	1,162
Middlesex	—	15	15	611	291
Norfolk	—	192	192	5,759	3,971
Northants	—	85	85	2,376	1,850
Northumberland	—	65	65	2,167	1,143
Notts	1	175	176	3,851	2,345
Oxford	—	46	46	1,292	1,139
Rutland	—	8	8	156	107
Salop	1	261	262	7,872	3,825
Soke of Peterborough	—	1	1	37	31
Somerset	1	252	253	6,647	3,087
Staffs	—	206	206	6,050	3,243
Suffolk, E.	1	88	89	2,122	1,543
Suffolk, W.	—	50	50	1,030	637
Surrey	—	104	104	3,040	1,393
Sussex, E.	3	177	180	4,521	2,664
Sussex, W.	—	113	113	3,234	1,931
Warwick	—	140	140	3,379	2,131
Westmorland	—	13	13	354	444
Wilts	—	90	90	3,640	1,823
Worcester	2	156	158	3,250	1,538
Yorks, E.R.	—	105	105	1,620	957
Yorks, N.R.	—	117	117	2,381	1,490
Yorks, W.R.	—	258	258	6,352	2,424
WALES					
Anglesey	—	49	49	868	623
Brecon	—	8	8	174	105
Caernarvon	—	111	111	1,724	957
Cardigan	—	31	31	585	421
Carmarthen	—	250	250	4,497	2,342
Denbigh	—	50	50	975	503
Flint	—	116	116	2,586	1,160
Glamorgan	—	105	105	1,743	691
Merioneth	—	9	9	117	55
Monmouth	—	54	54	1,272	713
Montgomery	—	15	15	294	233
Pembroke	—	74	74	1,463	1,054
Radnor	—	—	—	—	—
TOTALS	18	6,745	6,763	174,068	94,949

Notes.—(1) Operative periods of undertakings: 1 year, 1,127; 2 years, 520; 3 years, 5,116. (2) Undertakings renewed for a further period: 1 year, 979; 2 years, 178; 3 years, 178. (3) Undertakings not renewed at end of operative period, 780. (4) The figures showing the number of undertakings notified during the month relate to entirely fresh undertakings and do not include undertakings renewed for a further period. Undertakings which have been cancelled, or not renewed, are not included in the figures for previous notifications.

County	Undertakings Notified: During Month	Undertakings Notified: Previously	Total Undertakings: Number	Number of Cattle: Cows	Number of Cattle: Heifers
SCOTLAND					
Aberdeen	—	18	18	752	219
Angus	—	21	21	838	395
Argyll	—	6	6	113	115
Ayr	—	32	32	1,003	766
Banff	—	3	3	93	42
Berwick	—	2	2	53	22
Bute	—	—	—	—	—
Caithness	—	—	—	—	—
Clackmannan	—	7	7	282	257
Dumfries	—	13	13	707	610
Dumbarton	—	3	3	105	86
East Lothian	—	3	3	145	88
Fife	—	36	36	1,349	703
Inverness	—	8	8	324	191
Kincardine	—	3	3	127	83
Kinross	—	3	3	56	40
Kirkcudbright	—	13	13	778	657
Lanark	—	19	19	730	549
Midlothian	—	1	1	44	69
Moray	—	—	—	—	—
Nairn	—	1	1	14	—
Orkney	—	—	—	—	—
Peebles	—	2	2	28	16
Perth	—	29	29	677	425
Renfrew	—	7	7	277	201
Ross-shire	—	2	2	58	52
Roxburgh	—	—	—	—	—
Selkirk	—	—	—	—	—
Stirling	—	29	29	931	789
Sutherland	—	5	5	104	76
West Lothian	—	1	1	23	18
Wigtown	1	27	28	1,839	1,066
Zetland	—	—	—	—	—
TOTALS ..	1	294	295	11,450	7,526

Notes.—(1) Duration of undertakings: 1 year, 38; 2 years, 13; 3 years, 244. (2) Undertakings renewed for a further period (included in column 2 of statement): 1 year, 37; 2 years, 6; 3 years, 7. (3) Undertakings expired and not renewed (not included in column 2 of statement): 93. (4) The figures showing the number of undertakings notified during the month relate to entirely fresh undertakings.

* * * * *

D.D.T. AND FLY CONTROL IN COWSHEDS

In the June issue of the *Journal of the Ministry of Agriculture*, Mr. K. L. Blaxter, of the Weybridge Laboratory, records the results of carefully controlled experiments with D.D.T. (spray applied) insecticide in the control of flies in cowsheds, these being carried out at various centres, under the auspices of the Agricultural Improvement Council and the Agricultural Research Council. The results of spraying walls and/or cattle, taken as a whole, show quite distinctly (states the author) that D.D.T. insecticide cannot be used as a single measure to reduce the inconvenience, annoyance and economic loss caused by flies. "This does not mean that D.D.T. insecticide has not a place in the measures taken to control flies and other pests. Thus where it is possible to reduce the number of flies which enter a building by window screening, D.D.T. insecticide can be used to reduce the number to a very considerable extent while further experiments have shown that a single dusting of cattle and pigs with the preparation will control their lice.

"At the moment supplies of D.D.T. insecticide are not available for sale to the public, owing to the demand for it in the services, and it will probably not be obtainable, except for experimental purposes, until the cessation of hostilities. Careful attention to the rules of good hygiene about farm buildings is still the most effective method of reducing the number of flies present in the summer months. Manure should therefore be quickly removed from cowsheds, boxes and stalls to well-constructed clamps away from the buildings, and the cows and cowshed should be kept as clean as possible during this time."

* * * * *

GUERNSEY CATTLE FOR KENYA

A record purchase of imported cattle for Kenya was made recently by Lt.-Colonel Budd, of Waterfall Farm, Moiben. Lt.-Colonel Budd visited South Africa last year to inspect pure bred Guernsey and Jersey cattle. The result of his visit was the arrival in Kenya not long ago of six Jersey cows in calf, one young bull, two Guernsey cows in calf, two yearling heifers and two bulls. The owner is hoping to visit South Africa again before long to make further purchases for Kenya, principally bulls, as he feels that the need for pure bred bulls in Kenya as soon as the war is over will be very great, if Kenya is to compete in the world market for butter.—*Colonial Office News Service.*

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal views of the writer only and must not be taken as expressing the opinion or having received the approval of the N.V.M.A.

Letters to the Editor should reach the Office not later than by the first post on Monday morning for insertion in following Saturday's issue.

* * * * *

R.C.V.S. COUNCIL ELECTION

Sir,—In his somewhat rambling letter in your issue of May 26th upon mine of the 19th by my old friend Mr. Steele-Bodger, the only criticism I can discover is that I suggested the electors should expect and seek some guidance from the stated views of the candidates themselves. No one knows better than Mr. Steele-Bodger that the election addresses have a long and weighty background. The grave matters at issue in this election have been discussed, written about and debated upon for several years, and in the case of the great majority of the candidates their views have been freely expressed elsewhere. That is the background and the addresses were only cited as bringing it up to date—since some politicians wobble in their convictions—and as such they appeared to me to be both useful and necessary to the electors. But to Mr. Steele-Bodger, an "experienced politician," which thank goodness I am not, they are worse than useless. There must surely be several kinds of fog hovering over Tamworth just now, for he professes to get no help or perceive any guidance from the issued statements made by 18 out of the 22 candidates. He also tells us that he does not care to know how the candidates stand upon the vital issue in this election. In short, whilst offering no practical alternative guidance, he airily dismisses the addresses with obvious contempt and more than a hint that their authors do not mean what they say.

I submit that this sort of talk is not only unworthy nonsense, but rather offensive to their authors. Also when he tells us they are no guide to him as to their views, he surely underestimates his own intelligence—as he certainly strains my credulity. He urges that "individual integrity, ability and high ideals" are necessary in any candidate. I agree profoundly, but I consider these qualities to be the monopoly of no party, and am content in the belief that there is no lack of them among those pledged to support the continued integrity of the position of our governing body. I want all those qualities in a candidate, but also I want something more, namely an assurance as to where he stands politically, and consider it my duty to find out if I can, for after all an election is not a social function but a serious responsibility. If a candidate will not tell me it may be to our mutual loss, but it is not my fault and I am blunt enough to consider I have a right to know. Otherwise I might just as well follow the example of the punter who shuts his eyes and pricks his race card with a pin, or that of the recent criminal bungler who followed his "intuitions" with such disastrous results.

Back again in the fog over Tamworth, Mr. Steele-Bodger asks, "is the issue so clear cut"? and in reply common sense asks, "what other issue is there in this election which clouds the clarity of his vision?" I have, however, a shrewd suspicion that it is the clarity of the vision of the electorate which he dreads and perhaps hopes to cloud by a subtle smokescreen.

Mr. Steele-Bodger tells us opinions are sometimes reversed in the atmosphere of the R.C.V.S. Council chamber to what they were outside. He himself has been on the Council since 1939, and no one there and elsewhere has been more outspoken in support of the continued integrity of our College, and in condemnation of those clauses of the Loveday Report which would reduce it to impotence. For example, as lately as July 18th last (page 102, *Record Supplement*, September 23rd, 1944), in a Council meeting, he is reported as saying, "they (the Loveday Committee) should define what they meant by the one-portal system. Did they mean one register or one examination? He thought the report in this respect was a sop to the Council and as such was *dishonest* because they said they were retaining the one-portal but it was simply to be one register: that was a one-portal which he did not think mattered two hoots"—pretty strong words there.

In the same issue (page 106) he voted for a motion which declares, "this Council emphatically disagrees with the recommendation that there should be any alteration either in the constitutional form of government of the profession or in the one-portal mode of entry." Far be it from me to reproach anyone for changing his mind: next to the man who can never make up his mind at all, the one I care least for is he who cannot or will not change it if conditions or circumstances alter. If Mr. Steele-Bodger has done so, "on conditions" which satisfy his reason, I applaud him—but have they changed?

The Loveday Report still contains—among others—the following clauses: (*a*) "The Council of the R.C.V.S. should be *required* to place upon the Register of the College the names of all graduates

of universities authorised by the Privy Council to confer registrable degrees." (*b*) "We *strongly urge* any universities which may be given power to confer registrable degrees, to include practising veterinarians among their external examiners in clinical subjects." Please note that in para. (*a*) the key word is "required," *i.e.*, "compulsory," but in para. (*b*) it is only "*urge*" and therefore optional—surely a masterpiece of "heads I win, tails you lose."

In the last sentence of his letter Mr. Steele-Bodger says, "I would plead that however they vote their decision should be based upon *reason* rather than *shibboleth*." So it looks as if the one-portal system and the century old constitution of our Royal College for which he has pleaded so strongly and "with some heat," has now become to him a mere shibboleth not based upon reason. May I remind him that in elections there are always opposing shibboleths, and not one only as he suggests. In this election there are at least two, such as, "Up University Status," and say, "Stand firm, R.C.V.S." I suggest that if the price of the former remains what it is, the profession should refuse to pay it and carry on.

Yours faithfully,

Sandy Lane, Prestatyn, N. Wales. E. P. Edwards.
June 1st, 1945.

. . . . .

Sir,—As the signatories of the recent election circular, it is gratifying to note that the candidates we named received no less than 3,747 more votes than the others.

Yours faithfully,

Thomas Lishman.
J. T. Edwards.

June 5th, 1945.

. . . . .

Sir,—Although unsuccessful, may I be permitted space sincerely to thank those who were good enough to cast a vote for me in the Council Election.

Yours faithfully,

63, Derngate, Northampton. J. J. Dunlop.
June 9th, 1945.

* * * * *

VETERINARY EDUCATION

Sir,—After indulging in verbal wriggling that could only be described as immature, on the part of any reasonably responsible controversialist, Dr. Wooldridge uses many words to make confusing statements in a sustained, but ineffectual, attempt to escape from his previously made, and inaccurate, claim that under the recommendations of the Loveday Committee, "The uni-portal method of entry into the profession was maintained by retaining membership of the R.C.V.S. as the only qualification for practice, and giving powers to the Council of the R.C.V.S. to ensure both a minimum standard of instruction and qualification. In this way the uni-portal character of veterinary education is maintained, it remaining a one-portal system in so far as a minimum standard of qualification and the licence to practise is concerned, although each centre may set its standard of instruction and examination anywhere above this minimum."—(*The Times*, June 12th, 1944.)

My reply to this, which must have escaped the observation of the Editorial Committee of *The Veterinary Record*, was as follows: "Dr. Wooldridge's statement in *The Times* of June 12th that under the Loveday Committee's recommendations the one-portal character of veterinary education is maintained is erroneous. At present there is one examining board whose final examination qualifies for admission to the profession. The Loveday Committee proposes the creation of at least four other separate and independent examining bodies whose examination shall admit to the Veterinary Register. The one-portal system would thus be destroyed."—(*The Times*, June 27th, 1944.)

In spite of his having sat as a member of the Loveday Committee, one must, most regretfully, come to the unavoidable conclusion that Dr. Wooldridge does not even yet understand what the words "uni-portal" mean.

If the term means anything at all it is that the R.C.V.S. is the sole examining body capable of giving a registrable qualification, and such things as "membership of the College," "maintenance of minimum standards," "supervisory powers," and "inspections of schools," etc., can in no way qualify this plain and simple meaning.

That the recommendations of the Loveday Committee, if carried out, will destroy the one-portal system must be perfectly obvious to all who are open to conviction, among whom, apparently, Dr. Wooldridge is not to be included. In fact, if his opinions are shared by the other members of the Loveday Committee (which I do not believe they are), then they must have been making recommendations on a matter of which they had only a very imperfect understanding.

Yours faithfully,

23, Queen's Gate Gardens, Thomas Lishman.
London, S.W.7.
June 2nd, 1945.

Sir,—In its Second Report, the Loveday Committee has emphasised that university degrees in veterinary medicine shall be registrable qualifications by the R.C.V.S. and by this College alone. It has also recommended that the R.C.V.S. shall continue its own examinations, which presumably would be confined to those existing veterinary colleges which do not become constituent parts of universities.

In effect, there would be two possible veterinary qualifications, *i.e.*, a university degree in veterinary medicine, and the diploma of M.R.C.V.S. granted only by the R.C.V.S.

It is recommended that the R.C.V.S. should be the *only body legally empowered to register either or both of these qualifications* and to *grant a licence to practise veterinary medicine*. In short, if a holder of a university degree failed to register he could not practise.

But this is not one-portal. It is multi-portal. It is futile to assert, or to presume, to the contrary.

I believe that if the decisions arrived at by the Council of the R.C.V.S. and sent by it in a letter to the Minister of Agriculture and Fisheries are accepted, in the course of time an eminently satisfactory solution to the present controversy will result. I prefer evolution to revolution. One must guard against the volatile tendency to fall a prey to the ephemeral and preserve the mind against plausible fallacy and the clamour of the hour. Prudence and patience are essential to translate our desires into achievable policies.

I am not prepared to exchange what I regard as a "first-rate monarchy" (namely, our one-portal) for a possible "second-rate republic."

In conclusion, may I quote an old Chinese proverb? It is: "If you're planning for one year plant grain; if you're planning for ten years plant trees; if you're planning for a hundred years plant men."

Yours faithfully,

"Rothiemurchus," J. F. D. Tutt.
St. Cross, Winchester.
June 3rd, 1945.

* * * * *

THE VETERINARY EDUCATIONAL TRUST

Sir,—I should have thought that my letter of May 16th under the above heading and published in your issue of June 2nd, did not allow of misinterpretation. Its object was to point out that a Research Fellowship under this Trust had been awarded to a non-veterinarian and to criticise the policy of the Council of the Trust in making this appointment. I am fully in sympathy with the aims of the Trust and appreciate how much the Council has already done in pursuance of its objects. The *only* point of criticism I made, and to which I adhere, is that it should be unnecessary to go outside the ranks of the profession to find candidates for the Research Fellowships. That, sir, was the root of my letter and nothing more. Having re-read it carefully, I can see no reason why Dr. Wooldridge should have considered it necessary to ask your readers to decide on the evidence advanced as to whether the Veterinary Educational Trust is assisting the advancement of veterinary science or not. I certainly did not raise the point. The question implied in my letter was, "Do the Council of the Veterinary Educational Trust propose to give Research Fellowships to non-veterinarians, and if so, why?" The answer to the first part appears to be yes, and is justified only on the grounds that an analogous position exists in other branches of the profession, *e.g.*, the colleges have non-veterinarians on their staffs. The circumstances are so different, however, that such an analogy cannot fairly be drawn, and, even if acceptable, one imagines that within the profession opinion is far from unanimous as to whether the filling of certain of the non-clinical appointments at our colleges by non-veterinarians in subjects which necessarily should be taught with a definite veterinary bias is a good policy. Rather, it should be a part of any educational planning for the future to encourage veterinarians to specialise with a view to the filling of such appointments.

I may say that the zoologist recently awarded a Research Fellowship is a former colleague of mine with whose work on the sheep blow-fly problem I am well acquainted, and who I am sure will hold his Fellowship with distinction. However, I am not concerned with personalities but with a principle. The appointment creates a precedent so far as the Research Fellowships are concerned and one which I, personally, deprecate. It would be a singularly weak argument that a veterinarian could not, and is not qualified to, work on the sheep blow-fly problem. In fact, the subject is so intimately related to factors such as parasitism that one would have imagined that a wider outlook on the problem such as a veterinarian possesses would be an advantage.

Yours faithfully,

Danebury, 31, Approach Road, H. Ivor Field.
Margate, Kent.
June 4th, 1945.